



2021



BOISE'S CLIMATE ACTION ROADMAP

Our community's plan for climate action.

A letter from

MAYOR LAUREN MCLEAN

Dear Boise:

Our planet - our community - is at a crossroads. Our days are getting hotter, our water resources are threatened, forests are burning, and air quality is worsening. As individuals, as a city, as a country and as a global community – we must take bold action to address climate change.

The City of Boise is positioned to face this crisis head on, because as a community that is what we do. We recognize that we are the generation that must solve this, for our children and theirs. Our health and our future prosperity depend on us acting now.

Boise will be carbon neutral, as a community, by 2050. In setting this goal, and taking the steps to achieve it, we will be doing our part to help address the climate crisis. This goal requires that we, as a community of individuals, businesses, and organizations, come together and each do our part. From using alternative transportation, to updating to energy efficient systems, this work requires each of us to change our behaviors, our environments, and our way of thinking – innovating solutions along the way.

Will it be hard? Yes. Can we do it? Of course. How do I know? Because I have seen Boiseans rise to the challenge before. We are a community that tackles hard things and protects what is special and sacred about this place. From our river to our foothills, we understand the need to protect our special place – and this is work that must be done so future generations can enjoy what we each love about Boise.

Climate action isn't just about the environment, it's about growing a strong, clean, and thriving climate economy. I'm optimistic about building a new economy in a world that's climate constrained because our prosperity is directly tied to the environment we work so hard to protect. In a 21st-century city, it's imperative that we seek the opportunities that climate innovation will bring us. Boise will be a climate innovation leader. As the world changes, we'll be poised to reap the benefits of locally-generated clean energy, healthier air and new jobs. As we innovate techniques here locally, we'll be able to export them. We can and will take the challenges presented by climate change and turn them into opportunity that means prosperity for our people.

I am inspired by the younger generation who clearly understands the urgency of the climate crisis. Our youngest residents care deeply about these issues and expect us to take action to protect our planet. We must listen to their voices, be inspired by their actions, and invite their ideas to help us envision what is possible.

Boise, I look forward to partnering with you as we do our part to address the climate crisis. The only way we will truly make an impact is if we do this together – as individuals, as businesses, as a community. Together, we can create a city for everyone that will prosper well into the future.

Sincerely,



Lauren McLean
Mayor

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The City of Boise acknowledges the ancestral, cultural, traditional, and unceded territory of the Shoshone, Bannock, and Northern Paiute people on which the city is situated.



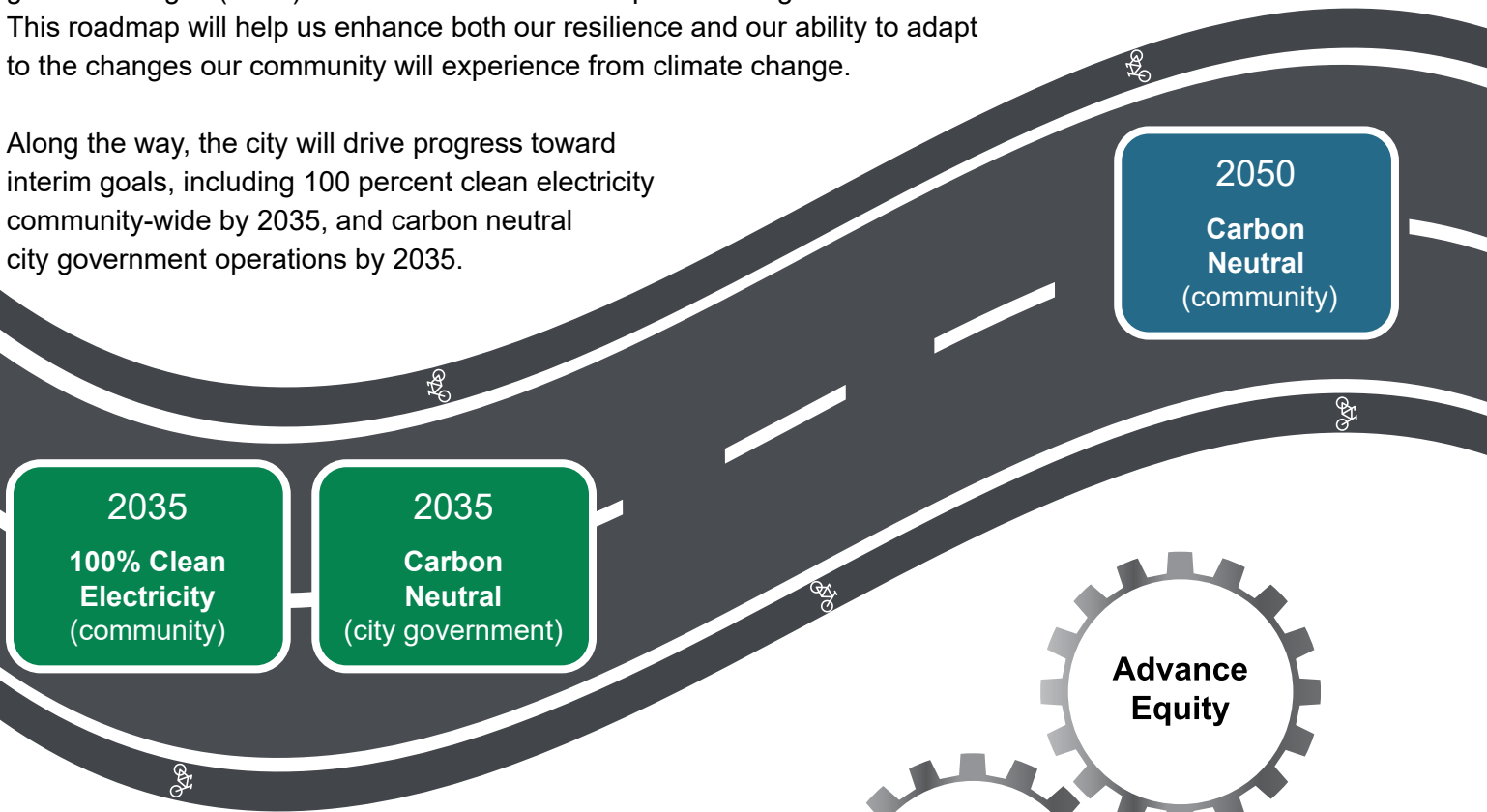
ROADMAP SUMMARY

Boise residents may be noticing differences in the Treasure Valley’s climate: hotter days in the summer, lower water levels in Lucky Peak Reservoir in the fall, and winter recreation starting later in the season. Residents may also be more aware of increased frequency and severity of wildfires that have been impacting our air quality. These changes in the local climate are consistent with past forecasts and current trends occurring across the country and around the world.

According to the 2018 National Climate Assessment (NCA), earth’s climate is now changing faster than at any point in the history of modern civilization, primarily as a result of human activities. The City of Boise is taking bold action to address climate change and is committed to ensuring that Boise is a resilient city. It is critical that all Boiseans work together to address climate impacts and innovate around the creation of a robust climate economy.

This roadmap is our community’s plan for climate action. It will inform our community journey to being carbon neutral by 2050. The term “carbon neutral” refers to the removal, to the extent possible, of all human-caused greenhouse gas (GHG) emissions from the atmosphere through reduction and removal measures. This roadmap will help us enhance both our resilience and our ability to adapt to the changes our community will experience from climate change.

Along the way, the city will drive progress toward interim goals, including 100 percent clean electricity community-wide by 2035, and carbon neutral city government operations by 2035.



On this journey, Boise’s climate actions will advance equity, improve human health and wellness, and grow a climate economy. The city will lead by example by improving city government operations, rethinking policies, and influencing systemic change. Engagement of all Boiseans will expand our collective impact.



Focusing our attention on seven climate action priorities will help address Boise's most pressing climate action opportunities. The roadmap's 23 opportunities will help catalyze community action and accelerate efforts to achieve Boise's climate goals. The opportunities support reducing emissions and increasing resilience to a changing climate. Opportunities identified in **bold** text below are immediate priorities for becoming carbon neutral. Opportunities identified in *italic* text below are immediate priorities for enhancing climate resilience.

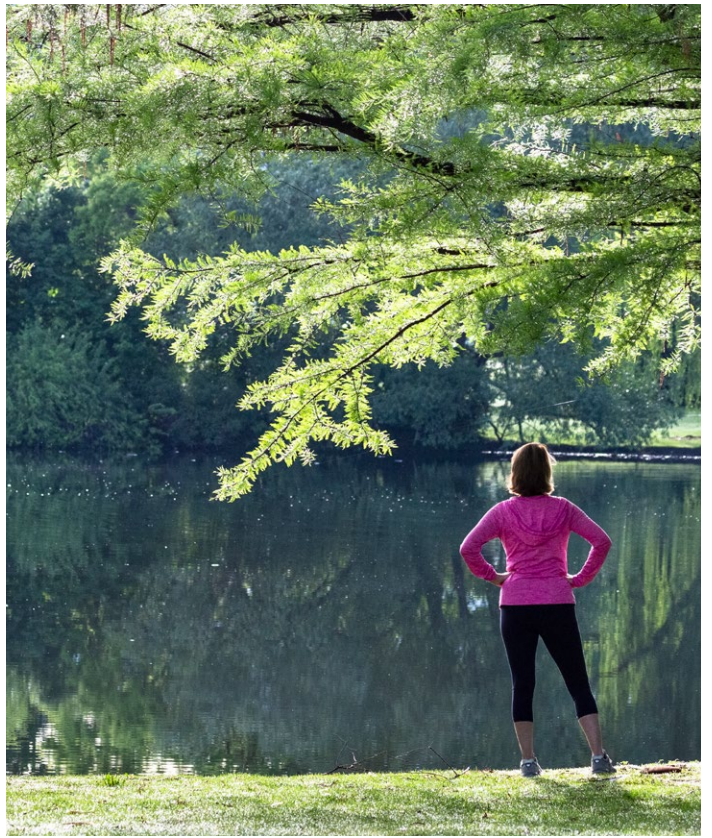
Climate priorities advance Boise's climate goals in various ways. Together, all of the climate priorities present potential emissions reduction and resilience benefits, but the extent of these benefits vary.



Bold = immediate priority to become carbon neutral

Italic = immediate priority for climate resilience

While Boise alone cannot solve the global climate crisis, our community and local government have significant potential to inform, influence, shape, test and contribute to the solutions. Together, we will make this important journey to a resilient and carbon neutral Boise.





A ROADMAP FOR CLIMATE ACTION

The City of Boise recognizes the need to move quickly and embraces the opportunity to take bold steps to address climate change. The Treasure Valley is already experiencing climate change impacts such as water supply variation, deteriorating water quality, prevalent wildfire activity and increased temperatures (University of Idaho, Boise State University, Langdon Group, 2016). Local climate action, coupled with collaboration at the state and national level, will position Boise to be more resilient to future climate impacts.



Innovating to reduce local environmental impacts and discover new resilience solutions will help Boise grow a robust climate economy. By embracing natural and creative solutions, Boiseans can change the trajectory for future generations and leave a positive legacy of economic, community and environmental benefits.

According to the 2018 Special Report by the International Panel on Climate Change (IPCC), “global warming is likely to reach 1.5° Celsius (C) between 2030 and 2052 if it continues to increase at the current rate” (IPCC, 2018). The worst impacts of climate change may be avoided if global temperature rise can be kept within 1.5°C above pre-industrial levels. Limiting global warming to 1.5°C will require **“rapid, far-reaching, and unprecedented changes in all aspects of society”** (IPCC, 2018). While Boise alone cannot tackle this challenge, bold local efforts will help catalyze the necessary societal changes.

This roadmap serves as a strategic guide for our community to accelerate community climate action in Boise. Climate action encompasses activities related to both reducing greenhouse gas (GHG) emissions and increasing community resilience to a changing climate.

ROADMAP ORIENTATION

This Climate Action Roadmap establishes local climate commitments related to reducing GHG emissions and improving climate resilience. It prioritizes quick action by city government and engaging the Boise community in implementing the roadmap opportunities. The roadmap organizes existing and new initiatives across our community under an umbrella of climate action.

Three principles guided the roadmap development and will help shape and optimize future implementation efforts. The roadmap’s framework of climate priorities and opportunities help detail the range and type of action needed to achieve the goals. Actions are prioritized as near-term (within the next 3 years) and longer-term (beyond 3 years).

VISION & GOALS

The overarching climate action commitments in Boise.

GUIDING PRINCIPLES

The core tenets of successful local climate action.

CLIMATE PRIORITIES

The major areas of focus for local climate action.

OPPORTUNITIES

Broad community efforts to advance each climate priority.

ACTIONS

Specific activities to support each opportunity.

VISION & GOALS

The City of Boise is dedicated to being a climate action leader. Boise's vision and climate goals demonstrate the community's climate commitments.

This roadmap is rooted in the City of Boise's vision of **“creating a city for everyone.”**

It will advance the City of Boise's mission by involving the community in implementation of the roadmap, innovating and investing to protect the environment, and promoting a thriving local economy.

This roadmap establishes a series of emissions reduction goals and a climate resilience goal to advance local climate action:

- **Carbon neutral city government by 2035**
- **Carbon neutral community by 2050**
- **Enhance community resilience and our local ability to adapt to climate change impacts.**

The drivers behind these goals are described on the following pages.



REDUCING GREENHOUSE GAS EMISSIONS TO BECOME CARBON NEUTRAL

GHG Emissions Reduction Goals

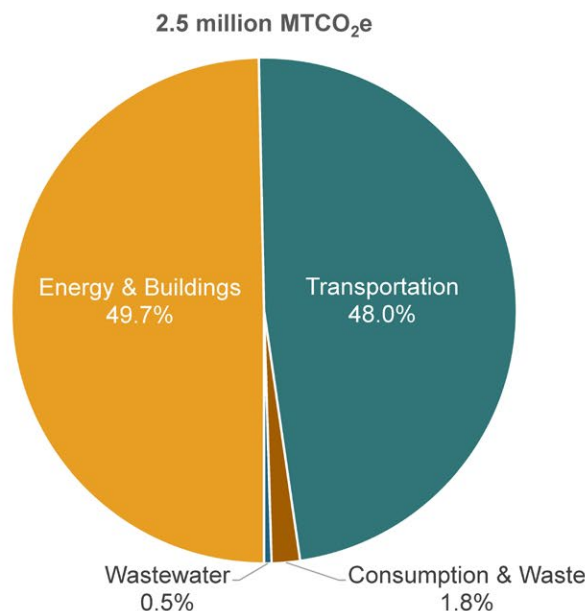
- Carbon neutral municipal government by 2035
- Carbon neutral community-wide by 2050

Emissions reduction (i.e., “mitigation”) focuses on actions to reduce or prevent GHG emissions and lessen human impacts on the climate system. Throughout this roadmap, the term “carbon neutral” refers to the removal, to the extent possible, of all human-caused GHG emissions from the atmosphere through reduction and removal measures.

Boise has been tracking community GHG emissions since 2000 to understand current conditions and determine where the city can act toward mitigating climate change. Community-wide emissions from 2018 are shown in Figure 1. Totals are shown in metric tons of carbon dioxide equivalent (MTCO₂e), a standard unit of measurement for greenhouse gases. In 2018, Boise’s overall community emissions totaled 2.5 million MTCO₂e and 9.1 MTCO₂e per capita. Compared to 2015, overall community emissions have increased by 3 percent. However, per capita emissions have decreased, due in part to changes in electricity fuel source and vehicle fuel efficiencies.

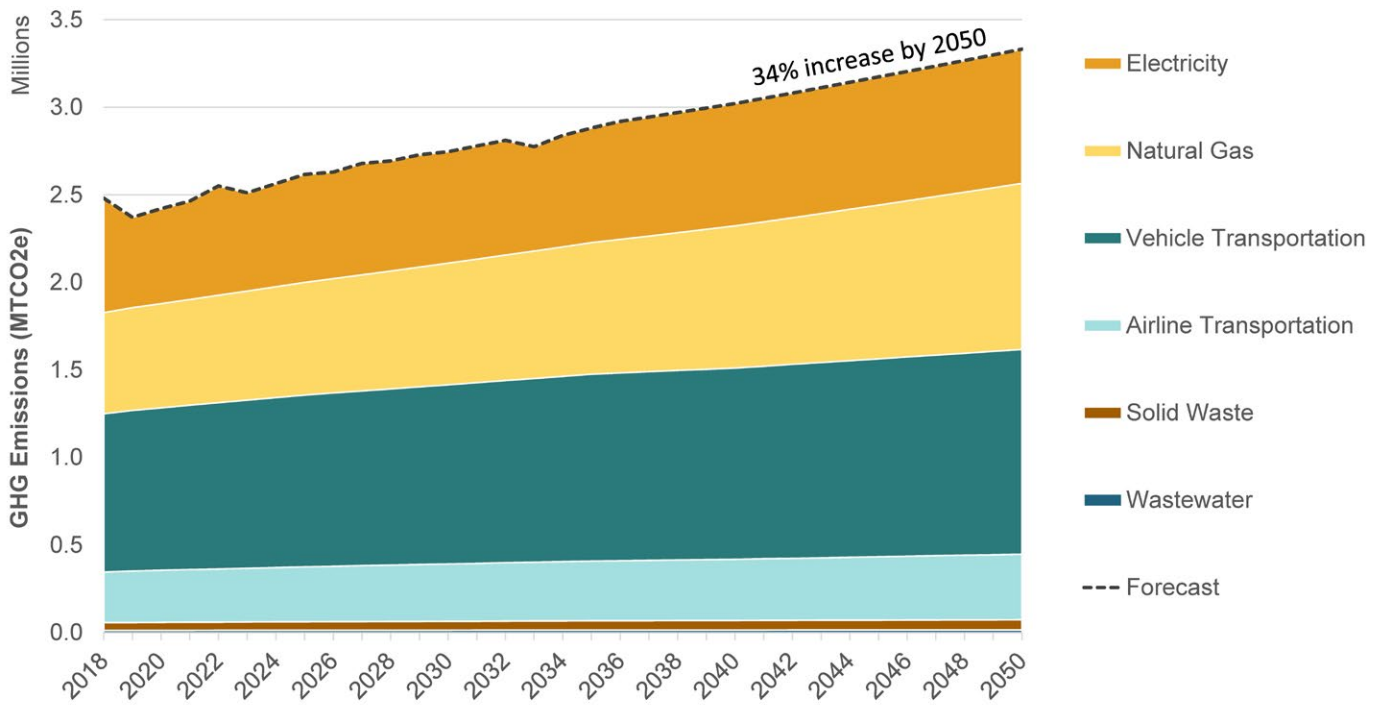
The two largest sources of emissions are the energy we use in our buildings and for transportation. Building energy emissions include both residential and commercial uses of electricity and natural gas. Transportation emissions include fuel use for on-road transportation, off-road transportation (e.g., backup generators, construction equipment, lawn and garden equipment) and airline transportation. The solid waste source includes emissions from both landfill waste and compost. Wastewater emissions account for heating, cooling and powering water renewal (wastewater treatment) facilities, as well as emissions created from effluent.

FIGURE 1: COMMUNITY-WIDE EMISSIONS BY SOURCE IN BOISE, 2018



The forecast considers changes in GHG emissions over time, based on the 2018 inventory, with no emissions reduction actions by the city or other entities. Population growth will have a significant impact on the forecast as more building occurs, vehicles are driven, and waste is generated. As the community continues to grow, GHG emissions are expected to increase by an estimated 34 percent by 2050, as shown in Figure 2. The forecast fluctuates with annual changes in electricity generation, especially due to the variable nature of hydroelectricity, which relies on annual precipitation.

FIGURE 2: PROJECTED 2050 BOISE EMISSIONS WITH NO MITIGATION ACTION



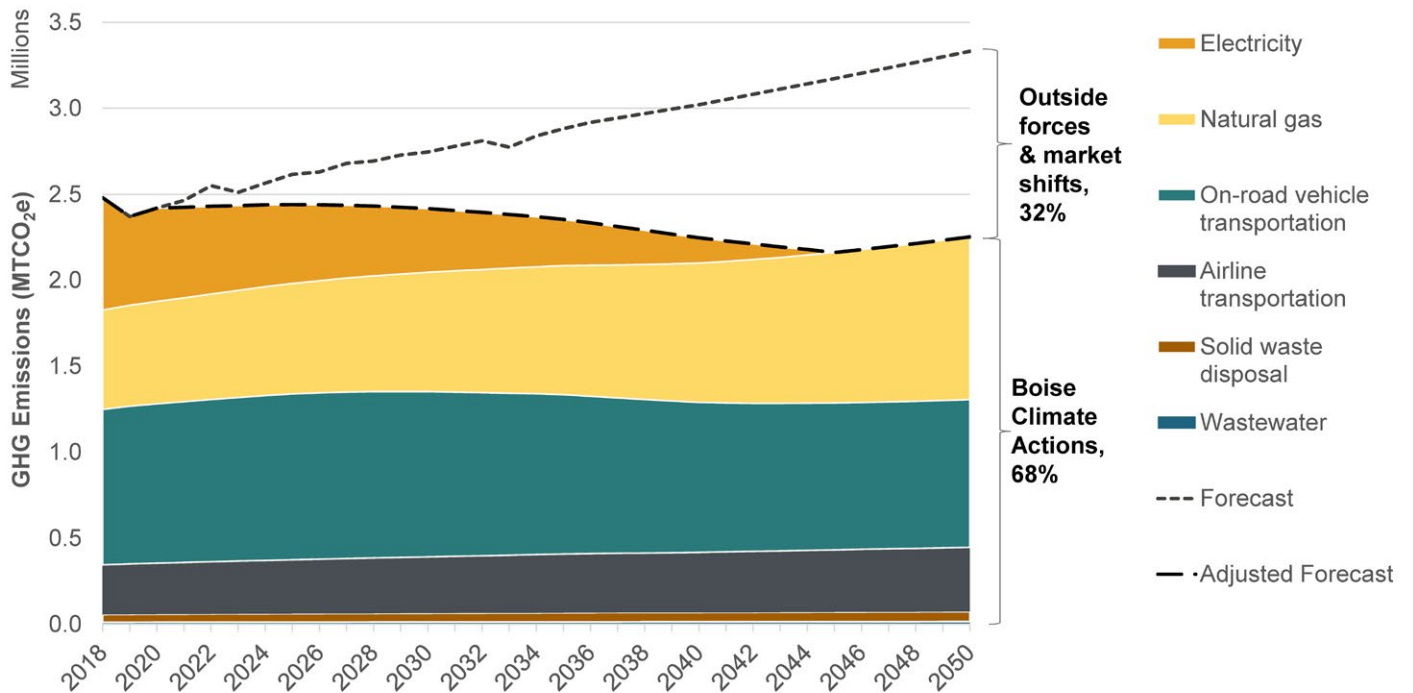
This roadmap builds on current climate action efforts to date, recommending opportunities and actions to reduce, eliminate and offset greenhouse gas emissions in Boise across these sources, while also accounting for population growth.

Boise is not alone in setting climate goals. Key partners and outside forces, including policies (at the state and federal level) and market shifts, will also impact the community’s GHG emissions. These anticipated shifts and outside forces are shown in the adjusted forecast in Figure 3.

Idaho Power, Boise’s electricity supplier, has committed to providing 100 percent clean electricity by 2045 (shown by the reduction in the yellow electricity wedge), resulting in a 23 percent reduction from the forecast shown in Figure 2. Adoption of the most recent building codes will address energy use in residential and commercial buildings, accounted for in both electricity and natural gas. Growth in fuel-efficient and electric vehicle adoption is also expected, reducing emissions from transportation by 9 percent from the forecast in Figure 2. Combined, these changes in electricity supply, building efficiency, vehicle fuel efficiency and electric vehicle adoption result in an adjusted forecast 32 percent below projected 2050 emissions.

To become carbon neutral by 2050, the remaining emissions shown in the adjusted forecast need to be mitigated through climate action. This requires immediate and high-impact action, both to reduce emissions and prevent them from increasing as Boise continues to grow.

FIGURE 3: ADJUSTED FORECAST OF BOISE GHG EMISSIONS BY 2050



INCREASING RESILIENCE TO A CHANGING CLIMATE

Climate Resilience Goal

- Enhance community resilience and our local ability to adapt to climate change impacts.

Reducing emissions alone is not enough for Boise to thrive amidst a changing climate. The community must also prepare for and respond, recover, and adapt to climate change impacts such as increased frequency of heat stress days, more heavy precipitation days, increased irrigation demands, extended drought, more poor air quality days, shifts in stream flows and threats to water quality.

Boise is already planning and implementing projects that enhance community climate resilience. Examples include planning for the use of recycled water as a means of creating a resilient water supply, and designing MaryAnne Williams Park to also serve as a flood control facility during high river flows.

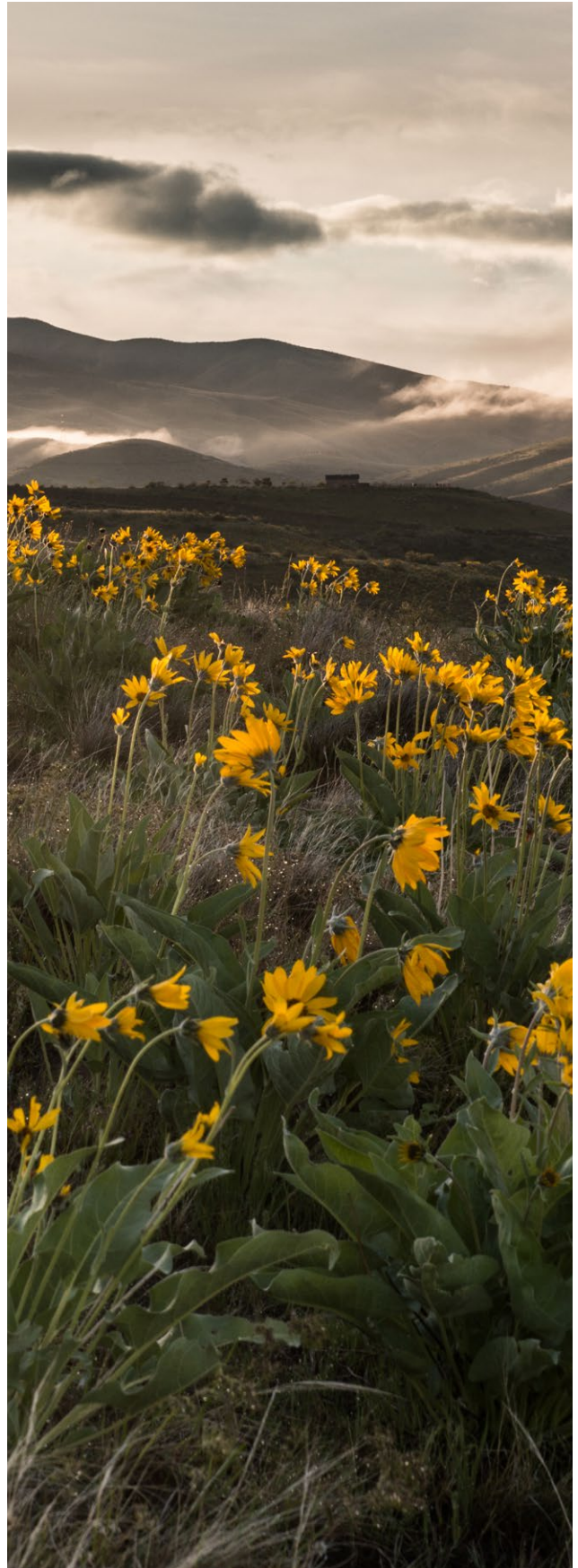
To prepare for future changes and enhance resilience, the City of Boise initiated the [Boise Climate Adaptation Assessment](#) (University of Idaho, Boise State University, Langdon Group, 2016). The study identified the most significant climate change related impacts that Boiseans will experience over the next 60 years. Based on scientific climate models, eight impacts were detailed:

- **HEAT STRESS DAYS:** The frequency of Moderate Risk days (heat index greater than 91 degrees F) for heat extremes will increase from a historical baseline of around 16 days per summer to 66 days per summer by the mid-21st century. High Risk days (heat index greater than 103 degrees F) have been exceedingly rare in Boise; however, such days will become more common during the 21st century.
- **HEAVY PRECIPITATION DAYS:** The occurrence of these events (daily total exceeding 0.7") is projected to increase in Boise by approximately 50 percent by early 21st century and nearly 100 percent by mid-21st century.
- **IRRIGATION DEMANDS:** Climate change will increase evaporative demand and irrigation requirements during the warm season. An increase of approximately 2 inches of irrigation is projected by early 21st century, and 4 inches of irrigation by mid-21st century.



- **DROUGHT FREQUENCY:** Moderate drought which currently occurs in 1 of every 4 years, on average, is projected to occur in 1 of every 2 years, on average, by mid-21st century. Drought frequency is projected to increase despite increases in heavy precipitation events due to increased evaporative demand with warming. Likewise, exceptional drought that historically occurs, on average, 1 out of every 12 years, is projected to occur in nearly 1 of every 3-4 years by mid-21st century.
- **POOR AIR QUALITY DAYS:** The duration of the summer period under which forests and high desert landscapes are predicted to be critically dry is projected to increase 40-100 percent, and the odds of very large fires in the Boise airshed region is projected to increase by 400 percent by mid-21st century. These changes suggest increased potential for chronic air quality problems within the metropolitan area.
- **SEASONAL STREAM FLOWS:** Seasonal shifts in river levels for the Boise River are projected, resulting in more runoff in the winter and spring and less during the summer months.
- **FLOODING DANGER:** No overall change in river flooding is projected. However, a greater proportion of high streamflow events are projected to occur during the fall through winter as a consequence of changes in snow and snowmelt timing on upstream watersheds, and more winter precipitation falling as snow and directly running off.
- **WATER QUALITY:** Earlier mountain snowmelt, increased evaporative demand, and extended periods of warm and dry conditions during the summer months are projected to result in further declines in low flows in the Boise River. Conditions that are detrimental to water quality and aquatic life are expected to increase substantially, with a 400 percent increase in the frequency of what are historically considered low flow levels by mid-21st century.

This roadmap leverages the Climate Adaptation Assessment, recommending opportunities and actions to improve Boise's ability to adapt to a changing climate and to be more resilient to these climate impacts.

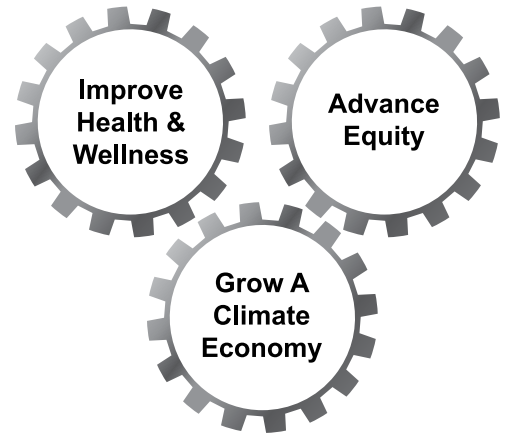


GUIDING PRINCIPLES

Three principles guided development of this roadmap:

- Advance equity
- Improve human health and wellness
- Grow a climate economy

It will also be important to reinforce these guiding principles as the roadmap is implemented. Focusing on these principles will help ensure that climate actions generate co-benefits, to the community, that extend beyond emissions reduction.



ADVANCE EQUITY

Creating a climate resilient community for everyone will include meaningful involvement regardless of race, language, color, gender, national origin and/or income. It will take diverse viewpoints and expertise, gained through engaging frontline communities in the implementation of climate action and related priorities, to achieve Boise's climate action commitment.

Diversity and inclusion are part of Boise's history, culture, identity and future. For example, Boise is a certified Welcoming City, demonstrating its inclusivity toward all residents, including immigrants. Prioritizing equity applies to all current and future Boiseans. Boise's leadership as a Welcoming City could position Boise at the forefront of the growing area of climate migration, a sub-topic of climate justice that recognizes people who leave their homes and relocate to other communities because of climate impacts.

To help inform climate equity principles, the City of Boise is developing the Clean City Index -- a distributional environmental justice, health and equity baseline. The goal of this assessment is to understand where there are disparities in access to environmental and health amenities or disproportionate exposure to environmental health hazards that tend to impact frontline communities. The information collected will cover proximity to hazards and sensitive land uses, health risk and exposure, and social, health and climate vulnerabilities. The data will include parameters such as air, noise pollution, flooding, extreme heat, distance from green spaces, and health facilities. In addition, the distribution of amenities such as tree canopy cover, parks, open spaces, sidewalks, bikeways, and walkability will be included.



The Clean City Index will produce a geographic-based indication of environmental justice and equity in the community and identify areas of the city that could benefit from additional focus and investment. This work has never been more important than right now. Climate change disproportionately impacts racial and ethnic minorities in communities across the United States and around the world. Even in Boise, it is likely that some individuals, families, and groups are experiencing greater impacts from climate change than are others. Using the Clean City Index to inform climate action will help address these inequities. In pursuit of climate equity, the city will focus on opportunities that advance the following principles.

CLIMATE EQUITY PRINCIPLES	QUICK FACTS & EXAMPLES
Meeting parallel and underserved communities where they are	Approximately 10 percent of Boise’s population speaks a language other than English (U.S. Census Bureau, 2019). Outreach and education about climate goals and opportunities will be provided in other languages, in accordance with city accessibility guidelines, in order to be meaningful and effective.
Protecting community members most vulnerable to Boise’s climate risks	Air conditioning, which can help protect Boiseans from higher heat days and wildfire smoke, may be unaffordable to some community members.
Ensuring equal access to the jobs and economic opportunities related to climate action	Climate action will create new green jobs in industries where some groups have been historically underrepresented, including energy efficiency, solar installation, engineering, recycling, heating/ventilation and air conditioning (HVAC) systems, weatherization, farming and land conservation.
Ensuring equal access to the new amenities and community resources related to climate action	<p>People with lower incomes have the highest rates of biking and walking to/ from work but often unsafe street conditions (Safe Routes Partnership, 2015).</p> <p>Public transportation use can save a family up to \$9,000 per year (Valley Regional Transit, 2018).</p>
Ensuring incentives, resources and funding mechanisms for households with lower incomes	Credit enhancement, incentives and grants can help households with low incomes participate in energy retrofits that will lower their monthly energy costs.
Watching for potential pitfalls related to climate action (e.g. housing affordability)	Costs for retrofitting a home to make it more energy efficient and produce its own solar electricity will lower monthly utility costs but may be cost prohibitive for some homeowners to implement. These retrofits also increase property values and may price some community members out of the resale market. As a result, a variety of income-based housing options will be needed to improve energy performance of the overall housing stock.

With these equity principles and considerations in mind, Boise will create a more resilient community for everyone. To do this successfully, Boise will need to engage a broad range of community members, including those traditionally not included or represented in the implementation of climate action opportunities.

IMPROVE HUMAN HEALTH & WELLNESS

While climate action is often viewed as an environmental issue, efforts to reduce emissions and improve community resilience can also create tremendous benefits for human health and wellness. For example, reducing tailpipe emissions from vehicles on Boise roads helps improve the air Boiseans breathe; and, expanding opportunities for walking and bicycling helps community members get the physical activity they need. Unfortunately, the climate is already changing due to GHG emissions, creating new climate risks in Boise that could have serious adverse health effects on residents.

BOISE CLIMATE RISKS	HEALTH & WELLNESS IMPACTS
Heat Stress Days	Heat stroke, dehydration
Drought	Limited access to healthy nutritional food and decreased access to water-based recreation
Poor Air Quality Days	Aggravated respiratory illness
Flooding	Exposure to injury and life-threatening situations
Water Quality Declines	Waterborne illness

In recognition of these impacts, the city has initiated discussions with health care interests in the community. While there is more work to be done, these preliminary discussions will help guide future work. Working together with health care interests, the city will pursue opportunities that infuse the following principles into both emissions-reduction and climate resilience opportunities.

HUMAN HEALTH & WELLNESS PRINCIPLES	QUICK FACTS & EXAMPLES
Improve air quality, both indoors and outdoors	In 2020, Boise had 20 summer days with unhealthy air quality (City of Boise, 2020). Poor air quality negatively impacts healthy outdoor recreation and sports activities. Poor air quality has an equity component as well, with greater impacts on outdoor workers and those experiencing homelessness.
Leverage climate action to benefit nutrition and physical activity levels	There are 121 miles of greenways, trails, and bikeways in Boise and over 171 miles of bike lanes. In Boise, the obesity rate among adults over 18 years of age is 25.8 percent (United Way of Treasure Valley, 2017). Approximately 13.2 percent of Boise households receive supplemental nutrition assistance program (SNAP) benefits (U.S. Census Bureau, 2019).
Foster social connections and support mental well-being to withstand climate stressors and bounce back quicker from climate hazards	Approximately 1,600 structures are at risk of flooding from the 1% annual chance flood (Boise Public Works, 2021). The First Street Foundation has provided an interactive tool to assess current and future flood risk of properties in Boise (see https://floodfactor.com/city/boise-city-idaho/1608830_fsid). The Boise Farmers market supports 108 local farms and food businesses and had more than 130,000 customer visits in 2019 (Boise Farmers Market, 2019).

As Boise further develops, prioritizes and implements climate action opportunities, it will need to explore and understand current inequities and extend opportunities and benefits to improve health and wellness to all community members. Robust community engagement and participation is vital to understanding current health and wellness needs and determining how to address those needs. The inclusion of health factors in the Clean City Index will support this guiding principle and provide ways to measure change over time.

GROW A CLIMATE ECONOMY

Many climate action opportunities will save Boiseans money by reducing their utility and transportation costs. While achieving these cost savings will require an upfront investment, it could produce both a positive return on investment and stimulate job growth in numerous green job sectors. These emerging markets and new

technology sectors, could benefit from local climate action initiatives. And this could, in turn, help position Boise as a national leader - a hub for innovative approaches and businesses focused on technical and social solutions to climate change.

Innovation and entrepreneurship have long been pillars of economic development in Boise. In addition to direct action that addresses climate change and the transition to clean energy, Boise seeks to position our city as a leader in climate solutions, clean energy and clean tech innovation through the development of a Climate Economy Accelerator/Incubator to support business acceleration and incubation around these important issues. This initiative would support the local economy and the growing local list of innovative businesses while also signaling, nationally, Boise’s intent to utilize cutting-edge solutions to the challenges that climate change presents. To grow a climate economy through climate action, Boise will create and focus on opportunities that advance the following principles.

CLIMATE ECONOMY PRINCIPLES	QUICK FACTS & EXAMPLES
Make clean energy a key area of focus and investment	The community spends approximately \$250 million annually on energy through monthly electric and natural gas bills and transportation fuels. Without climate action, this amount is expected to double in the next 20 years (Brendle Group & Ide Energy, 2019). This doubling provides an opportunity for the community to make better investments in clean energy promoting positive outcomes for climate action with potential to support the local economy.
Retain and expand existing businesses and industries that provide climate action-related products and services	A local economy supporting small businesses focused on climate action and resilience can create social cohesion and entrepreneurial opportunities to share skills and resources. Energy efficiency in Idaho has seen consistent, reliable job growth – 18.8 percent since 2016 (Energy4TheFuture, 2020).
Attract new businesses and industries, to create new jobs in climate action-related products and services	Clean energy (including geothermal), reliable infrastructure, a healthy urban river and healthy lifestyles are top strategies for attracting businesses to Boise. Boise is already a founding member of the Idaho Chapter of the Clean Tech Alliance, an organization that seeks to drive innovation for clean energy in Idaho by bringing together government entities, businesses, and nonprofit leaders to position Idaho as a clean energy leader and to pave the way for a prosperous, secure and healthy future.
Increase local workforce and skills development pathways in climate-focused industries	Trees cultivate and stimulate Boise’s green economy, generating 10,000 seasonal and full-time jobs (Davisson, Hargrove, Herzfeld, Maguire, & Welch, 2017). For Fiscal Year 2020, residential solar PV permits were up 12% and commercial solar PV permits were up 300% over the previous year (City of Boise, 2020), supporting solar and local construction industries.

An involved and engaged business community is critical to growing and advancing Boise’s climate economy. Boise will need to support and empower the business community in these pursuits, by being open to new ideas and creative partnerships, to accelerate economic growth and innovation. Furthering Boise’s identity as a place that prioritizes its livability equally alongside its goal to provide economic opportunity for all of its residents will be key to ensuring its success for decades to come.



CLIMATE PRIORITIES

Seven priority areas Boise should address to achieve its climate goals include:

BUILDINGS & ENERGY

TRANSPORTATION

CONSUMPTION & WASTE

FOOD SYSTEMS

NATURAL ENVIRONMENT

WATER

INNOVATION & ENGAGEMENT

A set of 23 opportunities supports each climate priority (see Figure 4). These opportunities represent the major initiatives Boise is already actively pursuing or could pursue to lead and influence achievement of our climate goals. Each opportunity includes details about why it is important along with a list of potential actions to drive implementation.

Actions include efforts currently underway that could be expanded or enhanced, as well as new opportunities the city or community partners could initiate. The roadmap also offers preliminary recommendations about who could be involved in implementation efforts, as well as preliminary priorities for near-term implementation.

FIGURE 4: CLIMATE OPPORTUNITIES



ADVANCING BOISE'S CLIMATE GOALS

Climate priorities advance Boise's climate goals in various ways. Together, all of the climate priorities present potential emissions reduction and resilience benefits; but, the extent of these benefits vary. As illustrated in Figure 5, the Energy & Buildings and Transportation priorities present significant GHG emissions reduction potential. In contrast, the Nature and Water priorities support community resilience and Boise's ability to adapt to a changing climate. The priorities at the middle of this graphic (Consumption & Waste, Innovation & Engagement and Food Systems) offer a mix of both emissions reduction and resilience benefits.

FIGURE 5: CLIMATE PRIORITIES AND THEIR RELATIVE EMISSIONS REDUCTION AND RESILIENCE BENEFITS

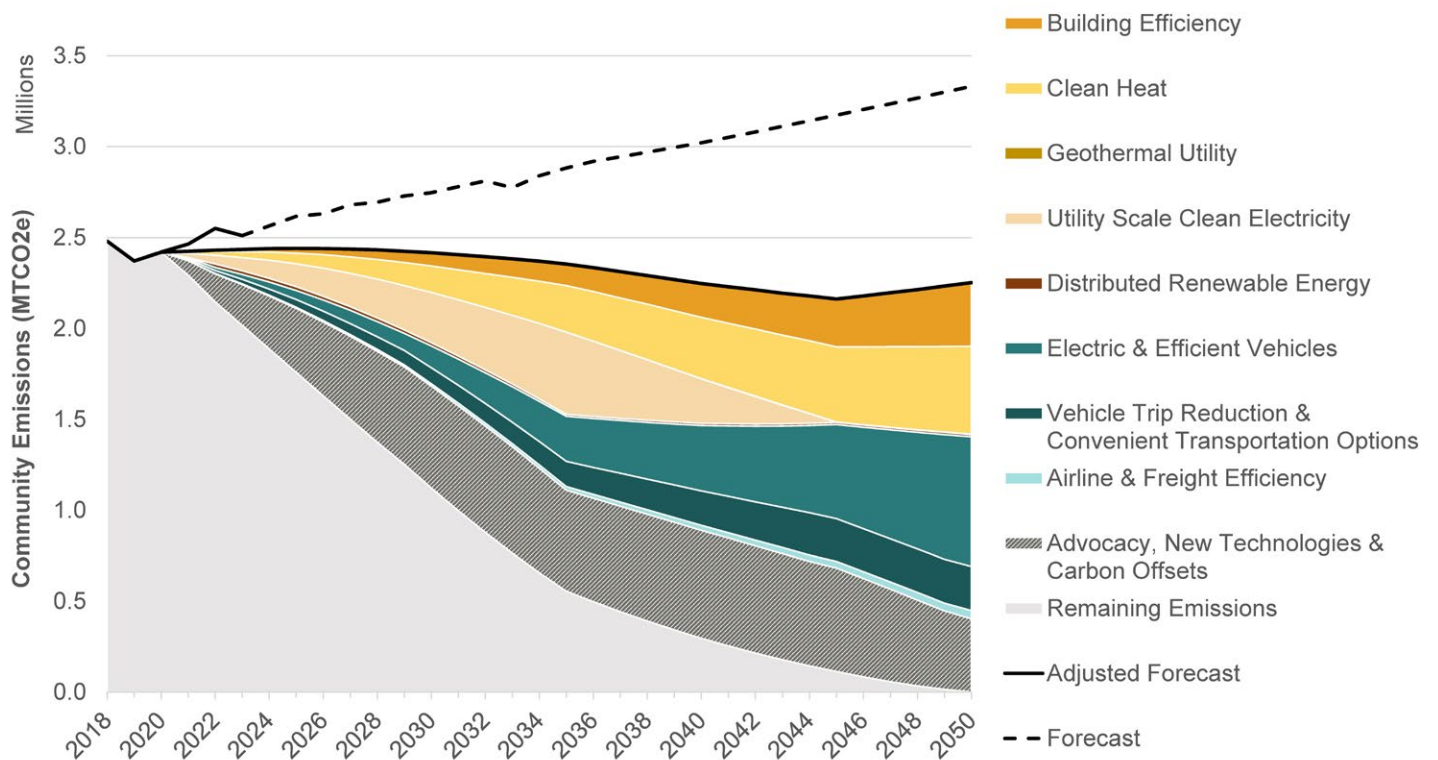


EMISSIONS REDUCTION BENEFITS

Of the 23 opportunities identified, nine have significant emissions reduction potential across the Energy & Buildings and Transportation priority areas. Based on modeling of the emissions reduction potential for each opportunity, Figure 6 summarizes the pathway for Boise to reach carbon neutral by 2050.

The dashed line is the forecast, assuming no changes to Idaho Power's fuel mix, building code, or natural adoption of electric vehicles. The solid line (adjusted forecast), accounts for these changes. Each colored wedge represents an emissions-reduction opportunity. The size of the wedge indicates its impact over time.

FIGURE 6: SUMMARY OF FORECASTED GHG EMISSIONS AND MODELED EMISSIONS REDUCTION BY ROADMAP OPPORTUNITIES



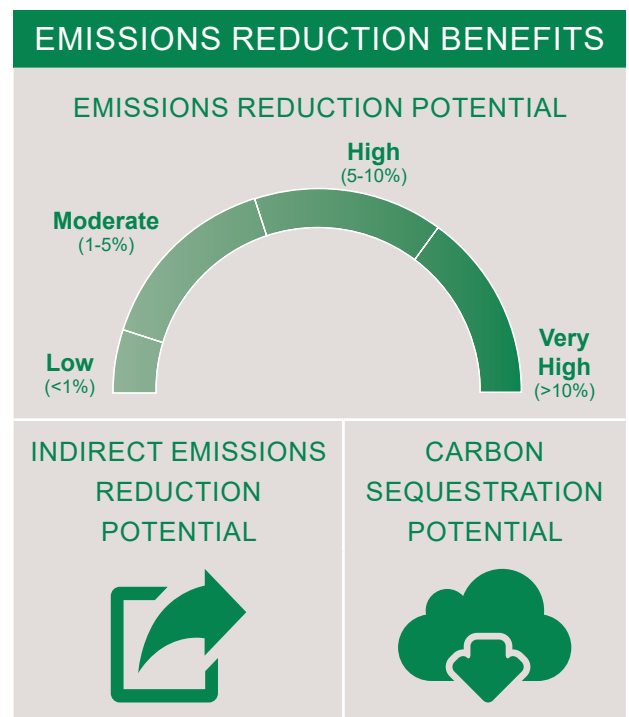
For each major emissions-reduction opportunity, the estimated contribution of the opportunity to the 2050 carbon neutral goal is summarized as a percentage of the needed 100 percent reduction. For some opportunities, the emissions reduction potential is shown as indirect (meaning it could reduce emissions that are accounted for in another opportunity or outside the community’s GHG inventory) or as a potential means for carbon sequestration.

It is important to note there are interim goals and emissions-related targets, before 2050, that will be critical to becoming carbon neutral by 2050. These interim targets are identified for each climate opportunity.

Although achieving these targets has a significant impact on reducing Boise’s forecasted GHG emissions, a gap remains in becoming carbon neutral. This gap is reflected in the advocacy, new technologies, and carbon offsets wedge shown in Figure 6; and, it accounts for 18 percent of emissions in 2050. For example, battery powered back-up generators are currently an emerging technology but are likely to have significant impact in the future. Over the next 30 years, Boise will consider other technologies, as they become relevant, in roadmap implementation and updates

RESILIENCE BENEFITS

Many of the opportunities will allow Boise to become more resilient to a range of anticipated climate-related impacts and hazards. These opportunities include but are not limited to heat stress, drought, heavy precipitation, wildfire, low-river flows and high streamflow events. Some of these opportunities emphasize adapting to changing climate conditions, while others focus on modernizing and upgrading infrastructure and systems to make them better prepared to withstand future climate-related shocks and stressors. For each opportunity, the potential resilience benefits are estimated and illustrated with a rank from low to very high.



RESILIENCE BENEFITS	
ENHANCE RESILIENCE	POTENTIAL BENEFITS
	Not Applicable No resiliency potential or could decrease resiliency
	Low Helps improve resiliency and adaptation to one climate risk
	Moderate Helps improve resiliency and adaptation to two climate risks
	High Helps improve resiliency and adaptation to three climate risks
	Very High Helps improve resiliency and adaptation to four or more climate risks

*Climate risks include heat stress, drought, heavy precipitation, fires, low river flows, and high streamflow events.



BUILDINGS & ENERGY

Emissions
Reduction
Emphasis



Resilience
Emphasis



This climate action priority focuses on reducing energy use in buildings by improving energy efficiency in existing buildings and new construction. It also focuses on supplying buildings with emissions-free energy sources, including those supplied by Idaho Power as well as locally produced energy sources such as solar and expanded geothermal.

BACKGROUND

REDUCING EMISSIONS FROM ENERGY USED IN BUILDINGS. Tackling the issue of energy used in buildings is critical to becoming carbon neutral because 50 percent of the community’s GHG emissions come from electricity and natural gas use. These numbers would be even higher without the GHG emissions-free geothermal energy used to heat residential and commercial buildings in Boise. Two percent of Boise’s energy comes from geothermal sources (Brendle Group & Ide Energy, 2019), with room for some expansion based on authorizations for increased pumping (City of Boise, n.d.).

Emissions from the electricity supplied to Boise are expected to continue to decline significantly as Idaho Power has publicized its plan to exit from several coal-fired power plants in the next decade (Idaho Power, 2020) and has set a target of 100 percent clean electricity supply by 2045 (Idaho Power, 2021). As Idaho Power continues on this path, a key component of this priority is shifting heating sources from natural gas to cleaner electricity or geothermal.

ENHANCING CLIMATE RESILIENCE. While this climate priority is mostly focused on emissions reduction, buildings also play a critical role in increasing community resilience. Buildings provide shelter from increased climate change exposures such as high heat, more intense winter storms, and wildfire smoke. Buildings designed or retrofitted with resiliency in mind are also better suited to withstand hazard events such as floods and chronic stressors such as drought. Finally, microgrids and distributed energy resources enhance the resilience of power systems during major events. Islanding from the grid can provide power to critical community services during outages.

QUICK FACTS



50%
of community GHG emissions are from energy – **27%** from electricity use and **23%** from natural gas use. (City of Boise, 2018)



1,400+
active solar photovoltaic systems in Boise, with a total capacity of almost 7.6 megawatts (MW) (City of Boise, 2020)



5,495
existing commercial and industrial buildings (Ada County Assessor, 2020)



96,801
existing housing units (U.S. Census Bureau, 2019)

BUILDING ON EXISTING CITY EFFORTS. The city has been working in each of these main opportunity areas for many years. For example, the Green Building Code, that provides a roadmap for builders and developers to incorporate energy efficiency into new construction, goes beyond the minimum requirements of code, adopting the International Green Construction Code (IGCC) for projects that want to be verified as green buildings. As a result, there are several verified energy-efficient green buildings in Boise, including multifamily buildings and office buildings throughout the community. Leading by example, several newer city facilities are either verified green buildings or public showcases of energy efficiency and renewable energy. These facilities include:

- The Twenty-Mile South Farm Administration/Shop Building, a biosolids application site, is a Leadership in Energy and Environmental Design (LEED) gold certified and is the first commercial net zero energy facility in Idaho.
- The Police Micro-District was recently remodeled as an all-electric facility.
- Biogas, produced during the water renewal process, provides building and process heat at the city’s two water renewal facilities.
- Four buildings, including Boise City Hall and the Library, are heated with geothermal energy.
- Solar energy systems are installed at City Hall West, Foothills Learning Center, Main Library at Bown Crossing, Boise Airport, Fire Station 9, and Twenty-Mile South Farm administration building.
- In total, the City of Boise has 8 facilities certified under the 2012 International Green Construction Code, 3 facilities with Leadership in Energy and Environmental Design (LEED) silver certification, and 1 facility with LEED gold certification.

IMPLEMENTATION PARTNERS

Listed below are some of the City of Boise departments, and community groups and organizations that could be involved in developing and implementing building and energy opportunities.

 CITY OF BOISE	 COMMUNITY GROUPS AND ORGANIZATIONS
<ul style="list-style-type: none"> • Community Engagement • Municipal Facilities Managers • Planning & Development Services • Public Works <ul style="list-style-type: none"> » Climate Action » Geothermal Energy » Solid Waste » Water Renewal 	<ul style="list-style-type: none"> • American Institute of Architects Idaho • Boise School District • Boise State University • Geothermal Districts (Boise Warm Springs Water District, State of Idaho, U.S. Veterans Affairs) • Homeowners Associations and Neighborhood Associations • Idaho Power • U.S. Green Building Council, Idaho • Integrated Design Lab • Intermountain Building Operators Association • Intermountain Gas • International Facility Management Association • Residential and Commercial Building Contractors and Trade Groups • Solar Energy Contractors and Trade Groups

OPPORTUNITIES

This roadmap details five opportunities to address the Buildings & Energy climate priority:

1. Building Efficiency
2. Clean Heat
3. Geothermal Energy
4. Utility Scale Clean Electricity
5. Distributed Renewable Energy



COMMUNITY IN ACTION

Here are some ways you can support the Buildings & Energy climate action priority:

- Take action to reduce energy (electricity and natural gas) use and improve efficiency in your home or business through: heating and cooling system upgrades, appliance upgrades, adding insulation, and installing programmable thermostats. You can also make simple changes in behavior like turning off lights and appliances when they're not in use, or adjusting heating and cooling temperature settings. A good place to start is with a Home Energy Audit, available through Idaho Power.
- Utilize utility incentive programs that offer rebates for efficiency actions (e.g., Idaho Power and Intermountain Gas rebates for heating and cooling systems, and several other efficiency measures).
- Look for opportunities to invest in efficiency and renewable projects that have a positive return on investment.

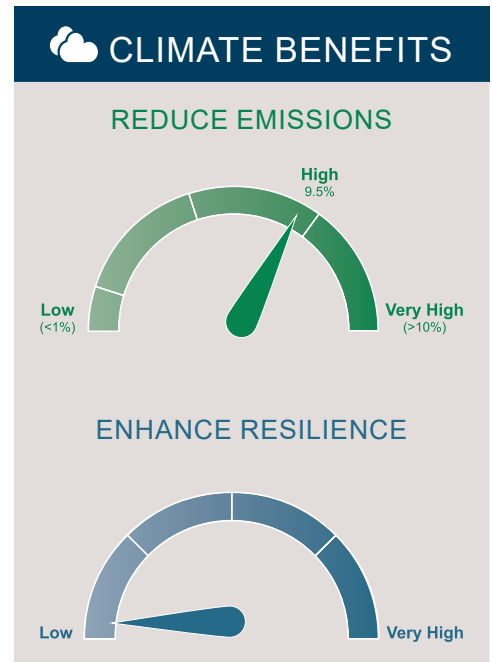
1. BUILDING EFFICIENCY

Boise homes, businesses and institutions spend approximately \$250 million annually on electricity and natural gas, with that amount expected to double in the next 20 years (Brendle Group & Ide Energy, 2019). Over the next 20 years, Boise is expected to grow by 50,000 new residents (COMPASS, 2014). This means Boise will need approximately 20,000 new housing units (Agnew: Beck & RPI Consulting, 2015).

This opportunity targets energy efficiency improvements to existing and new buildings. In addition to significant GHG emissions reduction potential, efficiency improvements lower monthly utility costs for homes and businesses, and increase jobs in energy efficiency and in design and construction trades. These improvements provide a community-wide economic benefit through increased financial investment in retrofits and construction enhancements that typically realize a positive return on investment.

Despite the significant GHG emissions reduction potential and economic co-benefits, this opportunity could also have unintended negative consequences, with disproportionate adverse impacts across the community if equity is not carefully considered. Building improvements tend to increase property values, making housing less affordable and potentially adding to affordability concerns in Boise. Already, some members of the community have a higher energy cost burden (percentage of household income that goes toward energy costs) due to income disparities and low construction quality that is linked to higher monthly utility costs. Landlords may raise rental costs, in buildings that have undergone energy efficiency improvements, to recoup their initial investment. Therefore, this opportunity needs to align building efficiency initiatives with other housing affordability initiatives. Affordable and realistic financing options for residents with lower incomes will also be important, to provide equitable access to energy efficiency and renewable energy investments promoted in this priority area. Finally, equitable access to green jobs through an inclusive workforce development approach will help increase the economic potential from this opportunity.

To achieve the target for this opportunity, virtually every housing unit and business will need to undergo some form of energy efficiency retrofit in the coming decades. Therefore, it is important to align this opportunity to areas within the city slated for major redevelopment or new development.



- Increase participation in energy efficiency programs so energy efficiency savings match annual energy use increase estimates by 2030.

ACTIONS

Near-Term Priorities

- ▢➔ Develop a detailed climate action and efficiency strategy for city government operations.
- ▢➔ Identify underutilized utility energy efficiency programs and barriers to participation, and bolster with localized outreach and implementation campaigns.
 - Partner energy efficiency programs with healthy building programs to fill gaps in low-income services.
 - Distribute Boise-specific outreach materials with case studies about the benefits of energy efficiency improvements.

Longer-Term Priorities

- ▢➔ Continue advocating for incremental improvements to efficiency requirements in every code adoption cycle.
 - Identify barriers builders face in following the Green Building Construction Code, and conduct outreach about the Green Building Construction Code to builders and developers.
 - Select a zero-emission standard to guide updates to the Green Building Construction Code.
 - Partner with utilities to develop a pilot program for efficiency or demand-side management (DSM).
 - Establish a community-wide voluntary benchmarking program for commercial buildings through a stakeholder process informed by building stock data.
 - Assess and expand existing finance structures, such as economic development incentives, tax increment financing or community development funds, to cover efficiency projects or to require efficiency improvements as a precondition for financing.

▢➔ Denotes existing actions that are already underway.

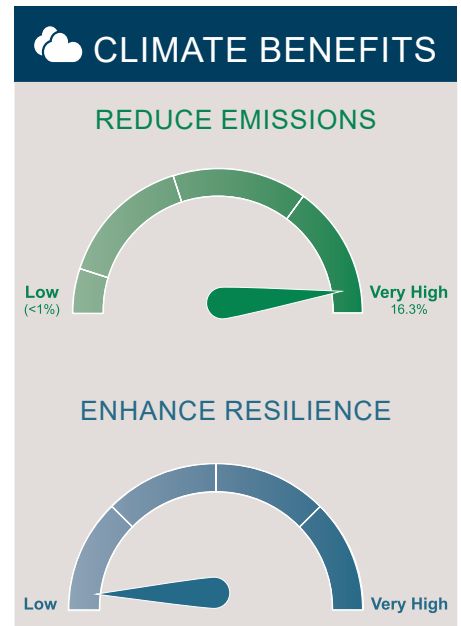


2. CLEAN HEAT

Nearly a quarter of community GHG emissions come from natural gas used in Boise homes and businesses for space heating and water heating. Using electricity, instead, for these purposes would reduce emissions immediately, as 50 percent of Idaho Power’s electricity already comes from clean sources (Brendle Group & Ide Energy, 2019).

Longer term, all emissions associated with space heating and water heating could be eliminated if Idaho Power continues its plan to transition from fossil fuels and achieve its goal to supply 100 percent clean electricity by 2045. Eliminating heating emissions would require local policy changes and market transformations that support all-electric new construction and retrofitting existing building stock to electric heating systems and appliances.

Moving to electric heat eliminates combustion systems in buildings, which can improve indoor air quality and contribute to a safer environment. However, retrofit cost-benefits can vary greatly and high adoption rates may leave a higher cost burden to remaining natural gas subscribers, including lower-income residents who cannot afford to retrofit their heating systems. Because switching to electricity at the community scale will place new demands on the electric distribution system, this opportunity will need to be implemented in conjunction with electric grid improvements. Like energy efficiency, this opportunity has good potential for job growth in the electric and heating trades.



TARGET

- Convert all new and existing residential, commercial and institutional buildings to high efficiency fossil fuel free heating systems by 2050.



ACTIONS

Near-Term Priorities

- ➡ Develop a thermal energy implementation plan.
- ➡ Develop a process to electrify city government buildings with major retrofits or repair and maintenance of space and hot water heating equipment.
- Work with Idaho Power to create an all-electric heat rate and rebate incentives for heat pump technologies.

Longer-Term Priorities

- Focus on helping underserved communities electrify, first by analyzing electrification impacts on energy burdened community members and pursuing bill payment assistance to mitigate cost impacts.
- Team with equipment representatives to develop contractor trainings on installation and design of heat pump equipment.
- Identify buildings using propane equipment, to see if switching to heat pump equipment is cost-effective near-term.
- Identify new construction or major renovation projects in the community that could serve as demonstration buildings or districts of 100 percent renewable electricity.
- Identify industrial natural gas users and learn what drivers would cause them to consider fuel switching.

➡ Denotes existing actions that are already underway.



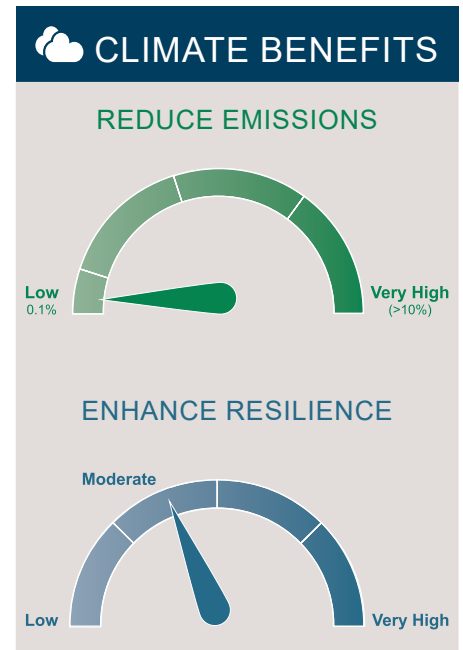
3. GEOTHERMAL ENERGY

Boise is unique among U.S. communities as it has another option besides natural gas or electricity, through a naturally occurring geothermal energy resource, for heating homes and businesses. The largest in the country, the City of Boise's geothermal heating utility delivers naturally heated 177°F water through a network of pipes that, as of 2019, warmed more than six million square feet of building space - over 90 buildings throughout downtown, with more planned (City of Boise, n.d.). In addition to the city geothermal energy, Boise Warm Springs Water District is the oldest geothermal water district serving residential neighborhoods in the east end of Boise since 1892. The State of Idaho and the U.S. Veterans Affairs Regional Office operate separate geothermal district heating systems and there are a dozen additional geothermal wells throughout the Boise River Valley.

While only two percent of Boise's energy comes from geothermal sources (Brendle Group & Ide Energy, 2019), there is room to expand that number (based on recent authorizations for increased pumping).

It's important to consider every opportunity on the path to carbon neutral energy, especially geothermal as it's a unique community asset. Local geothermal utilities contribute to community resilience through more locally controlled and diversified energy sources. Because the largest geothermal energy is a public utility owned and operated by the city, it may have more flexibility to ensure equitable and affordable access as it expands. Finally, like clean electricity, geothermal has benefits over natural gas because there is no direct combustion of fossil fuels in buildings so it results in near-zero emissions.

As the geothermal energy expands, energy efficiency improvements in the buildings served will help accommodate even more buildings that want to connect to the utility. In addition, efficient use of geothermal energy can make it more cost competitive with natural gas. To help with that, this opportunity includes a demand-side management (DSM) program similar to electric and gas utilities, to implement energy efficiency measures in buildings served. In addition to adding DSM, the utility could also innovate by testing and demonstrating new technologies to get even more out of this resource, such as low temperature thermoelectric applications.



- Expand the geothermal system by five million gallons per year until actual production volumes reach 355 million gallons, then apply for additional water rights to continue system expansion.

ACTIONS

Near-Term Priorities

- ➡ Complete a geothermal cost of service study for the city's utility.
- ➡ Develop educational materials about geothermal opportunities and distribute them to builders through Planning & Development Services.
- ➡ Establish a partnership with research entities like Idaho National Laboratory (INL), to identify potential research and innovation opportunities.
 - Systematically meet with buildings located near the geothermal system to encourage connections as part of an infill strategy to increase use with minimal additional costs.
 - Stay attuned to potential state and federal grant opportunities, to fund system replacement and expansion.
 - Organize a series of trainings with contractors and designers about the geothermal system, its benefits and design considerations.

Longer-Term Priorities

- Experiment with and support emerging geothermal system technologies, including low temperature thermoelectric applications.
- Consider developing a geothermal DSM program for the community around best practices and lessons learned from Idaho Power and Intermountain Gas.
- Consider opportunities to require connections to the geothermal system for new construction or major remodels.
- Meet with commercial and industrial customers who could make use of the geothermal loop for a heat sink for industrial processes and server room cooling.
- Establish a formal research and development program to consider better ways to leverage the geothermal system.

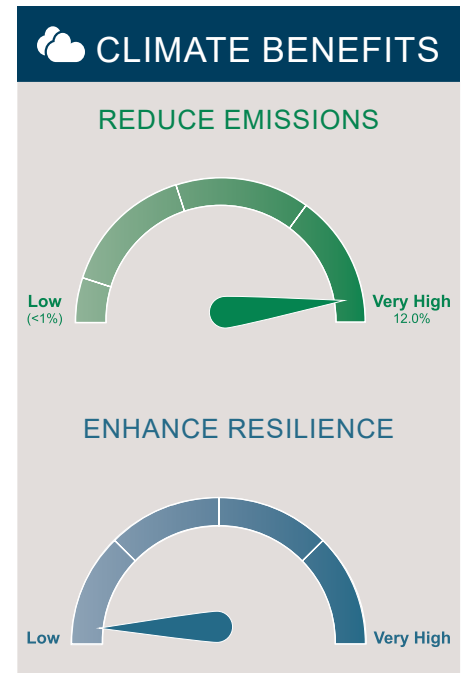
➡ *Denotes existing actions that are already underway.*



4. UTILITY-SCALE CLEAN ELECTRICITY

In Boise, more than a quarter of community GHG emissions come from electricity use. That number is lower than most U.S. cities because 50 percent of Idaho Power’s electricity already comes from clean sources, mostly hydropower. Idaho Power’s 2019–2026 Action Plan includes the addition of 120 MW of solar through the construction of the Jackpot Solar Facility in 2022; and, Idaho Power has publicized its plan to exit from several coal-fired power plants in the next decade (Idaho Power, 2020). Idaho Power has set a goal of providing 100 percent clean electricity by 2045. For customers who want more clean electricity than is included in its base supply, Idaho Power offers options for purchasing green power on a subscription basis.

The main objectives of this opportunity are to ensure Idaho Power stays on track with its 100 percent clean electricity goal service-area wide, while supplementing Boise’s electricity supply with utility-scale clean energy to achieve our more accelerated 100 percent clean electricity timeline. The supplemental utility-scale renewable energy would be developed by Idaho Power for Boise in the form of a green tariff.



TARGET

- Achieve the clean electricity transition goals identified in Boise’s Energy Future:
 - » City Government Goal: 100 percent clean electricity by 2030.¹
 - » Community Goal: 100 percent clean electricity by 2035 while prioritizing affordability and access for all.

ACTIONS

Near-Term Priorities

- ➡ Work with Idaho Power to pilot renewable energy procurement (green tariff) for city government operations.
- ➡ Continue participation in the Idaho Power Integrated Resources Plan Advisory Committee and Energy Efficiency Advisory Group and advocate for a more robust set of factors for measuring the benefit to customers of local renewable electricity investments.
- ➡ Publicize the retirement of Idaho Power’s coal generation assets.

Longer-Term Priorities

- ➡ Support initiatives to retire additional fossil fuel generation when feasible and cost effective.
- ➡ Work with Idaho Power to follow and implement innovations in integrating intermittent renewables through energy storage or other technologies.
- ➡ Support the optimization of existing hydroelectric resources.
- ➡ Encourage participation in utility renewable energy procurement opportunities (green tariff) by other communities in Idaho Power’s service area.
- Use the city’s existing communication networks and engagement strategies to inform residents and businesses about the current green power offerings and how they support the electricity goal.

➡ Denotes existing actions that are already underway.

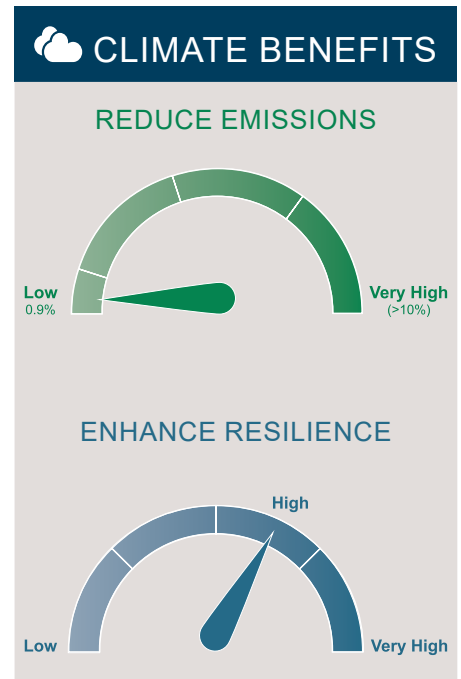
¹Since this is ahead of Idaho Power’s goal to achieve 100% clean electricity by 2045 it will involve utility-scale tariffs specific to Boise versus Idaho Power’s broader service territory.

5. DISTRIBUTED RENEWABLE ENERGY

There are over 1,400 active photovoltaic systems in Boise with a total capacity of almost 7,600 kilowatts (City of Boise, n.d.). Compared to utility-scale renewable energy opportunities, local distributed generation has community economic and resilience benefits. For example, with battery storage, distributed energy can provide back-up power in extreme weather events and locally owned generation reduces utility costs while stimulating jobs in a growing sector. Key components of this opportunity include removing permitting barriers, providing community education and information, expanding the solar workforce, and working on dedicated solar resources for households with low incomes.

TARGET

- ❑ Install 3.5 megawatts (MW) of rooftop solar each year.
- ❑ Install a 500-kilowatt (kw) community solar array every 5 years.



ACTIONS

Near-Term Priorities

- ➡ Develop metrics and tracking to increase solar installation levels to 3.5 MW/yr, tied to historical and forecasted adoption rates for different types/sizes of residential, commercial and community-scale installations.
- Build on the success of the SolSmart program to identify and eliminate additional barriers to on-site energy storage adoption. Create a permitting and interconnection process guide to encourage residents and businesses to become early adopters of energy storage technology.

Longer-Term Priorities

- ➡ Develop or share informational materials to help residents and businesses understand Idaho Power's new rate schedule and net metering provisions (when developed).
- ➡ Publish information about on-site renewable installations around the community. Use these examples to encourage residents and businesses to consider their renewable energy options.
- Adopt development incentives for new construction and retrofits that incorporate solar-ready design features.
- Work with Idaho Power to develop viable community solar projects that are cost competitive with on-site installations.
- Discuss how to structure future community solar installations to benefit community members who may not otherwise have access to renewable energy.

➡ Denotes existing actions that are already underway.



TRANSPORTATION

Emissions
Reduction
Emphasis



Resilience
Emphasis



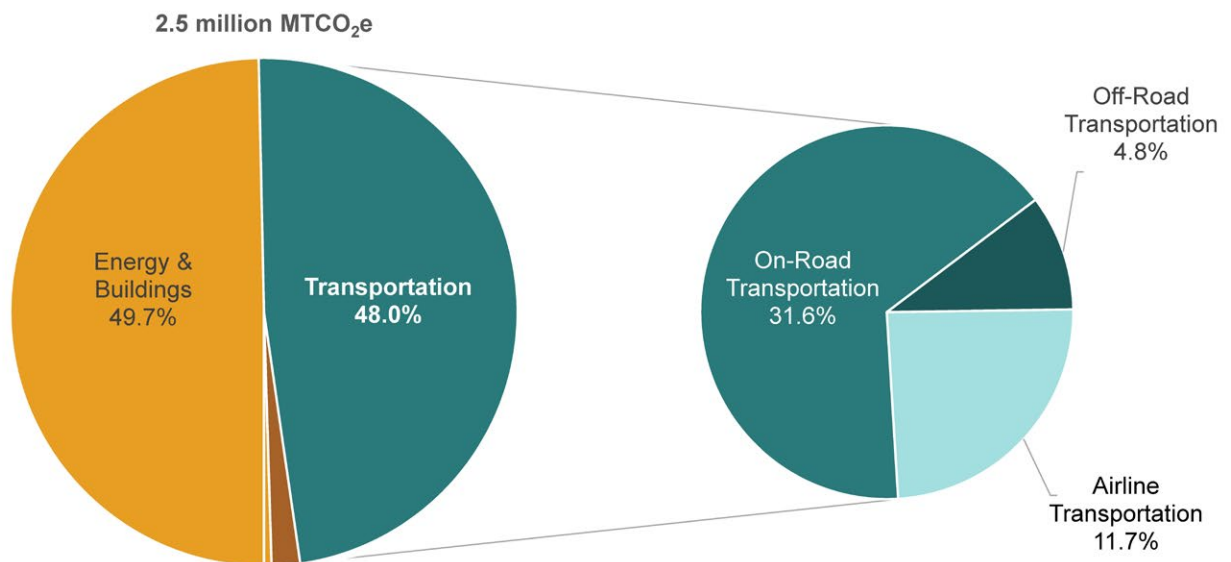
This climate action priority focuses on reducing the need for vehicle trips and on shortening vehicle trip distances. It also elevates walking, bicycling, public transit, telecommuting and carpooling as convenient and emissions-reducing mobility options. Finally, this priority emphasizes widespread adoption of electric and fuel-efficient vehicles and improving air and freight efficiency.

BACKGROUND

REDUCING EMISSIONS FROM TRANSPORTATION. The transportation sector is the second highest source of GHG emissions in Boise, accounting for 48 percent of total community emissions in 2018, up 18 percent from 2015. Of these emissions, 73 percent are from on- and off-road transportation (including light- and heavy-duty vehicles and lawn and garden equipment), and 27 percent are from air travel (see Figure 7). As Boise and Idaho Power work toward their goals of 100 percent clean electricity, the transportation sector is expected to become the largest source of emissions by 2022.

In addition to reducing GHG emissions, improving efficiency and reducing vehicle trips also provide air quality and health benefits by reducing ozone and particulate matter.

FIGURE 7: 2018 EMISSIONS BY SECTOR AND SOURCE, TRANSPORTATION HIGHLIGHT



Boise's Transportation Action Plan, Blueprint Boise (the city's comprehensive plan), neighborhood plans, and other existing efforts establish a solid foundation for transportation-related emissions reductions. This roadmap helps reinforce the linkages between those efforts and local climate action.

ENHANCING CLIMATE RESILIENCE. Transportation is an important consideration for community climate resilience. The impacts of climate change present growing risks and increased vulnerability of the safety, reliability, and sustainability aspects of transportation infrastructure (e.g., roadways, rail, public transportation). The community and economy rely on transportation infrastructure for the movement of people and the distribution of food, goods and services, all which can be impacted by climate-induced natural hazards.

BUILDING ON EXISTING CITY EFFORTS. The city is actively working to electrify its fleet, with plans to invest annually to incorporate EVs into it in coming years. The city is also supporting organizations such as Republic Services and Valley Regional Transit in integrating electric trash trucks and buses, respectively, into their fleets.

Beyond fleet electrification, Boise makes ongoing investments in bike, pedestrian and transit infrastructure, and collaborates with other transportation partners (e.g., Ada County Highway District, Valley Regional Transit) to expand transportation options such as adding protected bike lanes and expanding regional bus routes. The City of Boise also plays a key role in coordinating and operating the Treasure Valley Clean City Coalition (TVCCC), a program funded by the U.S. Department of Energy, to advance affordable, domestic transportation fuels, energy efficient mobility systems and other fuel saving technologies and practices locally.

QUICK FACTS



48%
of community GHG emissions are from transportation



12%
of GHG emissions come from air travel



0.33%
of vehicles were electric vehicles (EV) or plug-in hybrid electric vehicles (PHEV) in 2018



5,901
vehicle miles were traveled, per person, in 2018

All facts from City of Boise, 2018 & 2019.

IMPLEMENTATION PARTNERS

Listed below are some of the City of Boise departments and community groups and organizations that could be involved in developing and implementing transportation opportunities.

 CITY OF BOISE	 COMMUNITY GROUPS AND ORGANIZATIONS
<ul style="list-style-type: none"> • Community Engagement • Economic Development • Finance & Administration • Planning & Development Services • Public Works • Boise Airport 	<ul style="list-style-type: none"> • Ada County Highway District • Bike Treasure Valley • Boise Bicycle Project • Boise State University • Climate & Environmental Community Organizations • Community Planning Association of Southwest Idaho (COMPASS) • Idaho Power • Idaho Walk Bike Alliance • Treasure Valley Clean Cities Coalition • Valley Regional Transit

OPPORTUNITIES

This roadmap details four opportunities to address the Transportation climate action priority:

6. Vehicle Trip Reduction
7. Convenient Transportation Options
8. Electric & Efficient Vehicles & Equipment
9. Airline & Freight Efficiency



Here are some ways you can support the Transportation climate action priority:

- Commit to reducing single occupancy passenger vehicle trips at some frequency (e.g., once per day/week); combine errands into a single trip; walk, bike or use public transportation; shop close to home where practicable
- Consider purchasing an electric vehicle
- When traveling by air, consider purchasing carbon offsets from the airline or another appropriate source
- Consider switching to electric lawn and garden equipment
- Reduce vehicle idling as much as possible, especially on ozone alert days, by turning off your vehicle when waiting in school pickup lines, drive thru lines, etc.

6. VEHICLE TRIP REDUCTION

This opportunity focuses on shortening or eliminating vehicle trips through development of policies, codes, or incentives and behavior change. Examples include offering incentives for transit-oriented and mixed-use development to reduce distances between destinations, and setting parking space maximums to discourage unnecessary vehicle trips. Reducing vehicle trips should also be prioritized in land-use and comprehensive planning as the city grows.

In 2018, more than 1.6 billion miles were traveled by on-road vehicles in Boise, or about 5,900 miles per person, accounting for 32 percent of community emissions (City of Boise, 2018). As the population of Boise continues to grow, vehicle miles traveled (VMT) are also expected to grow, adding up to 200,000 additional vehicle trips per day by 2040 (COMPASS, 2014). Reducing vehicle trips, even as the city grows, is key to reaching Boise's climate goals.

In addition to a significant GHG emissions reduction potential, reducing vehicle trips also has positive impacts on air quality and, subsequently, on community health outcomes. And reducing vehicle trips promotes active transportation moves, such as biking and walking, that also improve community health.

Transit-oriented development can help stimulate economic development by improving residents' ability to access services, decreasing transportation costs, and reducing infrastructure costs associated with less compact neighborhoods.

From an equity perspective, focusing on more compact development and long-range planning that reduces or eliminate vehicle trips can provide increased access to transportation options for all Boiseans. It can also make streets safer for pedestrians, cyclists, and transit users. Compact development can also increase climate resilience by reducing the need for expansive roadways, thus reducing urban heat islands.

TARGET

- Reduce per capita vehicle miles traveled by one percent annually.



ACTIONS

Near-Term Priorities

- ➡ Continue promoting teleworking opportunities for city staff and encouraging businesses to establish telework policies.
- ➡ Modernize parking and transportation standards in development code updates to promote alternatives to driving alone, create more pedestrian friendly environments, reduce urban heat islands and equitably support all users.
- ➡ Continue to educate residents about how vehicle emissions contribute to air quality and health outcomes, and how changing behaviors like unnecessary idling and trip linking can reduce impacts.

Longer-Term Priorities

- ➡ Establish temporary and permanent car-free streets.
 - Provide financial or process incentives for compact development near transit, especially those that prioritize affordable housing.

➡ Denotes existing actions that are already underway.

7. CONVENIENT TRANSPORTATION OPTIONS

This opportunity builds on Opportunity 6. Vehicle Trip Reduction by encouraging people driving alone to shift to other modes of transportation, including walking, biking, public transit, carpooling and others. In 2019, 79.6 percent of Boiseans drove to work alone, 7.3 percent carpoolled, 6 percent worked from home, 2.8 percent bicycled, 2.5 percent walked, and 0.7 percent took public transit (U.S. Census Bureau, 2019).

Boise currently has 171 miles of bike lanes, and 121 miles of greenways, trails, and bikeways to support both recreation and transportation. The city also actively works with Valley Regional Transit to expand bus service throughout Boise and focuses on increasing frequency and providing late-night and weekend service for most-used routes. However, as sidewalk segments don't exist in 30 percent of the city, walking and other non-vehicular modes of travel are limited (especially for people with disabilities).

Focusing on alternatives to driving alone reduces GHG emissions, improves air quality, and offers health and wellness benefits from active transportation such as biking and walking.

Shifting modes of transportation from driving alone also results in cost savings from reduced fuel use and reduced vehicle maintenance, and can promote car-share, bike-share, and carpooling services and businesses. Expanded safe transportation options, including public transit and safer street conditions, will allow all Boiseans to access jobs and services.



- By 2025, eliminate one driving-alone trip per day per household².

ACTIONS

Near-Term Priorities

- ➡ Expand transportation incentives for city employees to use public transit, active modes of transportation and carpooling.
- ➡ Expand community car-share programs and establish bike-share programs.
- ➡ Prioritize investment in maintaining and adding new multi-modal infrastructure.
- ➡ Expand regional carpooling options.
 - Offer free public transit rides on poor air quality days.
 - Continue exploring opportunities to add bike and pedestrian pathways alongside the city's canal system.

Longer-Term Priorities

- ➡ Leverage canals as bike and pedestrian pathways.
 - Coordinate with large employers to provide shuttle options for shorter distances.
 - Identify city staff to conduct training and education, and to develop a culture that embraces multi-modal transportation.
 - Incorporate climate (e.g., heat, flooding) into transportation planning and improvement projects when feasible.
 - Collaborate with Valley Regional Transit to enhance the regional bus system.
 - Identify opportunities to offset public transportation costs for users with low incomes.
 - Increase micro-mobility options (e.g., scooters, e-bikes), particularly in the first/last mile to transit stops.

➡ Denotes existing actions that are already underway.

²Eliminating a driving trip includes not taking the trip or switching to another transportation mode, such as transit, bicycling, walking, or carpooling.



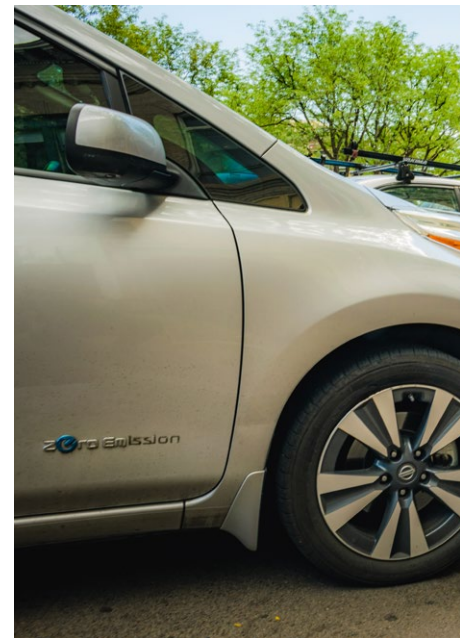
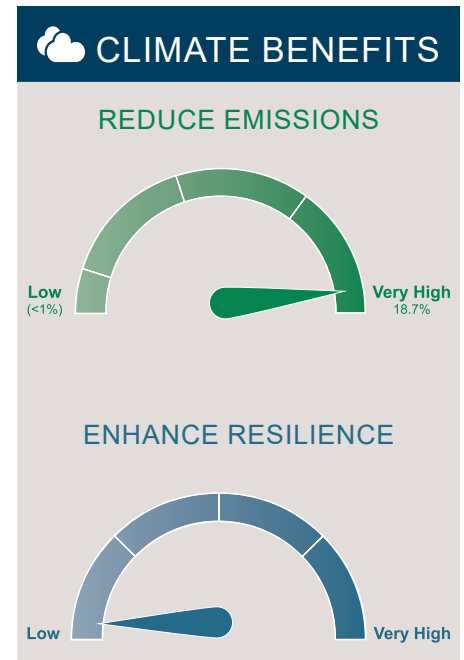
8. ELECTRIC & EFFICIENT VEHICLES & EQUIPMENT

In 2018, 97 percent of registered vehicles in Boise were gasoline or diesel fuel vehicles. Although these vehicles have become increasingly fuel efficient over the last decade, they still produce significant GHG emissions. This opportunity focuses on transitioning to vehicles and equipment that either use electric engines (e.g., EVs) or do not emit exhaust (e.g., zero emissions vehicles (ZEV), and providing adequate charging infrastructure to support the transition. This includes PHEVs, fuel cell, renewable natural gas (RNG) and hydrogen vehicles, and off-road equipment.

A significant barrier to EV/ZEV adoption is upfront cost considerations and lack of charging infrastructure, particularly for communities with lower incomes. Although EV and ZEVs often have higher up-front purchase costs, the full lifetime cost is often lower than internal combustion engine (ICE) vehicles because of reduced maintenance and fuel costs. Charging infrastructure inequities and costs can be addressed through policy, financial incentives and collaborating with local partners. Light-duty EVs are becoming increasingly common and technology for electric heavy-duty vehicles is rapidly evolving, therefore, both will be key components of achieving Boise's climate goals.

In addition to vehicles, equipment that uses gasoline or diesel fuel, such as lawn and garden equipment, is also considered in this opportunity. Technology is improving in this area through increased fuel efficiency and availability of electrified equipment. Education about these options and their benefits will be important in expanding adoption.

Beyond electrification, improving efficiency and encouraging alternative fuel vehicles and equipment (such as RNG) will also reduce emissions due to transportation. Implementing anti-idling policies, educating consumers about their options and advocating for fuel efficiency standards can all work to improve efficiency and reduce emissions. Improved fuel efficiency in both on-road and off-road equipment (including lawn and garden equipment) and anti-idling policies will also have positive impacts on air quality, particularly during ozone alert days when running or idling equipment can have significant impacts.



TARGET

- Transition to 100 percent electric light-duty vehicles by 2050.
- Transition to 100 percent zero emission medium- and heavy-duty vehicles and equipment by 2050

ACTIONS

Near-Term Priorities

- ➡ Continue investment in regional partnerships (e.g., TVCCC) to electrify private fleets.
- ➡ Develop a city government fleet replacement plan to convert vehicles and equipment.
- ➡ Install charging stations for employee and visitor use at city government and public facilities.
- ➡ Map ideal locations for new public charging stations.
- ➡ Develop guidelines for installing EV charging stations.
- ➡ Adopt EV-ready development codes.
- ➡ Coordinate with city franchise provider to implement electric trucks for trash, recycling, and compost collection including the deployment of 10 trucks in 2021
 - Host EV ride-and-drive and demonstration events to increase awareness and adoption.
 - Collaborate with car dealerships, auto mechanics and local workforce programs to develop EV-knowledgeable workforce.
 - Research and invest in alternatives to gas and diesel-powered lawn and garden equipment for city operations.

Longer-Term Priorities

-
- Pilot heavy-duty EVs and equipment for city government fleet.
- Monitor, apply, and share opportunities of EV grants, group purchasing, and financial incentives.
- Evaluate financial incentives for charging stations at homes and publicly available charging stations.
- Encourage alternatives to gas and diesel-powered lawn and garden equipment for community residents and businesses through education and demonstration events.
- Hold heavy-duty EV and ZEV vehicle and equipment demonstrations, as well as information sessions.
- Coordinate with the State of Idaho on best practices to consider for the Regional Electric Vehicle West (REV West) Memorandum of Understanding (MOU).

➡ Denotes existing actions that are already underway.

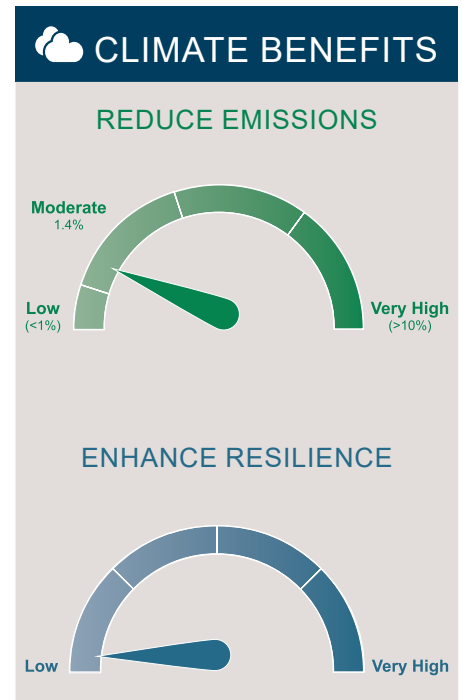


9. AIRLINE & FREIGHT EFFICIENCY

Emissions from airline transportation account for 12 percent of the community's GHG Emissions (City of Boise, 2018). As the busiest airport in the state, the Boise Airport served more than 4 million customers in 2019, a 6 percent increase from 2018, and continued growth in those numbers is expected (Boise Airport, 2019). Emissions from freight and other heavy-duty vehicles are included in on-road transportation emissions and the majority of these vehicles use diesel fuel which has higher emissions per mile traveled.

This opportunity focuses on advocating for more fuel-efficient practices in freight and air travel, and on educating passengers about the impacts of air travel on GHG emissions. Several major airlines that fly in and out of Boise (including United Airlines, 2020 and Delta, 2020) have made commitments to become carbon neutral, which will help reduce emissions associated with air travel in Boise. Technology is also rapidly evolving in both airline and freight efficiency, including new heavy-duty trucking technologies that reduce idling time and the use of fossil fuels, and improve efficiency. New technologies may also reduce noise pollution, which also offers positive health benefits.

Improving air and freight efficiency presents significant opportunities for reducing GHG emissions to help Boise reach its climate goals. It also will improve air quality in the area by reducing carbon monoxide and particulate matter (especially for neighborhoods near the airport), thereby providing positive health outcomes for communities. The opportunity to develop or deploy efficient airline fuel technologies or innovation options for air travel may also present business opportunities in the community that can be supported by the Climate Economy Accelerator/Incubator.



TARGET

- Encourage adoption of alternative fuel aircraft and fuel-saving practices at the Boise Airport.

ACTIONS

Near-Term Priorities

- ➡ Research and establish policies for city employee air travel (to avoid unnecessary trips) and explore the purchase of carbon offsets.
- Collaborate with Boise Airport to offer passengers options for offsetting their air travel emissions. Utilize local offsets when possible.
- Advocate for airline and freight efficiency standards and technology investment.

Longer-Term Priorities

- Research and share opportunities of grant funding that would help reduce diesel emissions from freight trucks.

➡ Denotes existing actions that are already underway.



CONSUMPTION & WASTE

Emissions
Reduction
Emphasis



Resilience
Emphasis



This climate action priority focuses on reducing total waste generated as a primary focus. A secondary focus is material recovery and reuse to divert waste from the landfill. Ultimately, these efforts could help Boise shift from a paradigm in which waste is a problem to be managed, to a circular economy in which resources are kept in use as long as possible and then recovered and regenerated at the end of their life. This shift would support job and business creation and growth.

BACKGROUND

REDUCING EMISSIONS FROM WASTE. While waste-related emissions are a small portion of Boise's GHG emissions (1.8 percent in 2018) (City of Boise, 2018), waste is a highly visible component of local climate action. Compared to the energy and transportation sectors, the GHG emissions reduction potential from the waste sector on the local GHG emissions inventory is minimal. However, national and global emissions associated with the production, transport, consumption, and disposal of goods and products is significant.

In recent years, Boise's total solid waste emissions are trending downward, though required changes in calculation methodology for commercial waste emissions will likely increase total emissions in future inventories. As the community grows, it will be important to address both per capita and total community waste volumes. Similarly, increased diversion rates of construction and demolition waste will be necessary to limit waste emissions.

ENHANCING CLIMATE RESILIENCE. As Boise prepares for climate-related hazard events like severe storms, the city and its waste partners like Ada County Landfill will need to plan for potential impacts such as surges in waste volume. Careful selection of building materials can help improve both durability and the ability to withstand hazard events, leading to less waste generation.

BUILDING ON EXISTING CITY EFFORTS. The City of Boise offers an array of waste diversion services, including curbside recycling, residential curbside composting, waste challenges and other special waste collection offerings like the Hefty® EnergyBag® program that discourages landfilling of items except as a last resort. Opportunities exist to expand composting efforts to businesses, though compost facility expansion would be necessary to accommodate program growth. The city can build on the success of the recent Boise Plastic Challenge, which encouraged residents and businesses to reduce single use plastics and engaged community members in other waste-related challenges and initiatives



QUICK FACTS



1.8%

of community GHG emissions are from waste



27% decrease

in GHG emissions from waste 2015 to 2018



138 pounds

of trash per month – average waste generated by Boise households in 2019



82%

of Boise businesses recycled in 2019

All facts from City of Boise, 2018 & 2019.

IMPLEMENTATION PARTNERS

Listed below are some of the City of Boise departments and community groups and organizations that could be involved in developing and implementing waste and consumption activities.

 CITY OF BOISE	 COMMUNITY GROUPS AND ORGANIZATIONS
<ul style="list-style-type: none"> • Community Engagement • Economic Development • Finance & Administration • Planning & Development Services • Public Works 	<ul style="list-style-type: none"> • Ada County Landfill • Boise State University • Grocery Stores and Restaurants • Product Recycling Businesses • Product Repair and Recovery businesses • Republic Services • Thrift and Resale Product Retailers • Western Recycling • Zero Waste Boise Institute

OPPORTUNITIES

This roadmap details two opportunities to address the Consumption & Waste climate action priority:

- 10. Waste & Consumption Reduction
- 11. Material Recovery & Reuse



COMMUNITY IN ACTION

Here are some ways that you can support the Consumption & Waste climate action priority:

- ❑ Fully utilize city recycling, energy bag and compost programs. Materials that are diverted from the landfill directly reduce landfill greenhouse gas emissions.
- ❑ Strive to purchase only what you need, buy quality durable products, donate used items to charities and thrift store.
- ❑ Look for opportunities to use existing products, rent (instead of buy) tools/equipment, borrow from your neighbors or start a neighborhood tool sharing library, and use secondhand items when appropriate.

10. WASTE REDUCTION & DIVERSION

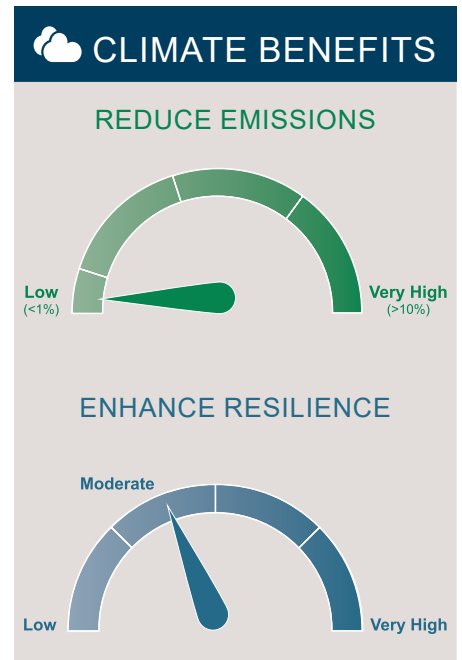
In 2018, Boise sent 186,921 tons of waste, roughly the equivalent weight of 11,300 empty trash trucks, to the landfill. This opportunity establishes a target to reduce landfilled waste through expanded waste reduction, reuse and diversion programs for residential and commercial sectors. Additional per capita and waste diversion targets will likely be established in the Waste Strategic Plan, which will begin in 2022.

Historic trends show that as the community and economy grow, so will total waste generated from consumer spending, manufacturing and building. To decouple these trends, Boise will need to address both consumption and waste generated at its source; therefore, this opportunity emphasizes individual and societal behaviors, with a focus on consumer education and informed product selection and purchasing.

Sanitary waste disposal is a critical service essential to maintain community and environmental health. Convenient and affordable access to these services for all residents and businesses is essential. While essential, the cost of waste services may present financial barriers to some populations, so careful consideration is needed in determining service rates. Similarly, the cost of high-quality, durable, or environmentally preferable goods and materials (such as canvas shopping bags or quality-made clothing and household goods) may be out of reach for some community members. Group or cooperative purchasing, and providing product alternatives that empower consumers to make decisions informed by life cycle costs, can help address some of these financial and access barriers.

In addition, diversion programs generally cost more than landfill disposal in Idaho, due to low landfill tip fees. The equity of increasing diversion programs (and therefore customer rates) will need to be considered. However, extending the life of the landfill will also help the community, long term, by deferring costs of new landfill siting and construction (along with increased transportation costs from hauling waste a greater distance).

By focusing on nurturing a circular economy (one that aims to eliminate waste and continually use resources) Boise can reduce waste generation, improve waste diversion rates and support local business and job creation in areas such as used goods, remediation, waste collection and materials recovery.



TARGET

- Enhance and expand waste reduction, reuse, and diversion programs for the residential and commercial sectors to decrease the percentage of waste sent to the landfill.

ACTIONS

Near-Term Priorities

- ➡ Update construction and demolition development standards to improve waste diversion.
- ➡ Implement a reduce and reuse program to expand community waste reduction efforts.
 - Update the Solid Waste Strategic Plan and set a specific waste reduction goal.
 - Evaluate a pay-as-you-throw pricing model as part of the Solid Waste Strategic Plan.
 - Pilot zero waste city government and community events.
 - Share tips and product alternatives that reduce waste and incorporate green products.

Longer-Term Priorities

- ➡ Encourage growth in secondhand and repair stores, and sharing services.
 - Establish a city government green procurement policy.
 - Coordinate and share community collaborative/bulk purchasing opportunities (e.g., reusable canvas bags, electric lawn and garden equipment, rooftop solar arrays, electric vehicles).
 - Incorporate construction waste diversion, life cycle assessments and sustainability analyses into city government construction projects.
 - Investigate potential for a construction and demolition waste facility that would increase reuse and recycling of these materials.

➡ *Denotes existing actions that are already underway.*



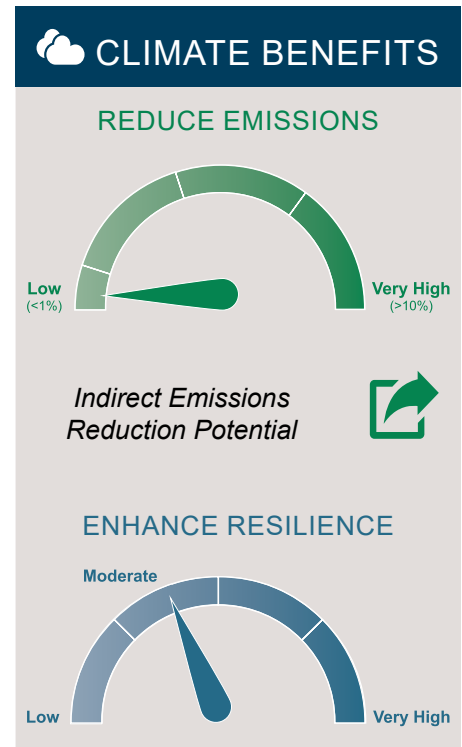
11. MATERIAL RECOVERY & REUSE

In 2019, Boise sent 17,575 tons of materials to be recycled, and 30,758 tons of organic material to be composted. While Boise has a relatively high rate of residential waste diversion (40 percent in 2019), much more can be done to increase waste diversion in the commercial sector.

As noted earlier, local GHG emissions reduction potential from the waste sector is minimal, but is still an important component of becoming carbon neutral and reducing global GHG emissions. This opportunity focuses on recycling, recovering, and reusing materials to prevent them from ending up in the landfill where they would break down and release methane. While Boise residents have access to a variety of solid waste services including trash, recycling, and composting, businesses do not yet have access to commercial composting services.

From a resilience perspective, local material reuse and recycling can reduce reliance on national or global imports. The resilience advantages of composting include environmental, health, and food production benefits (e.g., increased water holding capacity of soils and increased soil nutrients).

Thrift, resale and repair shops help keep goods and materials in circulation and help address affordability issues associated with new products. Product recovery and recycling businesses can help industries find economic opportunity in their waste streams. Demand for these types of composting, reuse, repair and recovery services also creates opportunities for new business creation and job growth.



TARGET

- Maintain at least 40 percent residential waste diversion annually and improve overall landfill diversion rate. Update targets to incorporate strategic planning outcomes.

ACTIONS

Near-Term Priorities

- ➡ Continue biosolid recycling efforts.
- ➡ Support growth in local product recovery and recycling businesses.
- ➡ Refine methods to quantify and share city government trash, recycling, composting, biosolid recycling and struvite recovery.

Longer-Term Priorities

- ➡ Explore opportunities for increased city government waste recovery and reuse, including analyzing city government waste streams and reuse options.
 - Expand community organics diversion opportunities and infrastructure.
 - Increase opportunities for community waste recovery and reuse, including reviewing community waste streams and reuse opportunities, and identifying potential implementation leaders and partners.

➡ Denotes existing actions that are already underway.



FOOD SYSTEMS

Emissions
Reduction
Emphasis



Resilience
Emphasis



This climate action priority focuses on expanding local food security and growing all facets of the food-related economy, to reduce climate impacts from the food system and increase access to healthy, affordable and climate-friendly foods. The action also emphasizes agriculture and land management practices as important elements of community resilience.

BACKGROUND

REDUCING FOOD-RELATED EMISSIONS. While the Treasure Valley Region is well known for its agricultural productivity, Boise imports the majority of its food. Boise's GHG inventory does not separate out food-related emissions; but, agricultural activities, food import/export, and other food-related activities impact local and global waste, water, energy and mobility-related GHG emissions. Note that food waste, while part of the food cycle, is predominantly addressed within the Consumption & Waste climate action priority.

ENHANCING CLIMATE RESILIENCE. The recent COVID-19 pandemic has illuminated several issues related to food system function, food security and reliance on a global food system. Climate change also presents potential impacts to the global food system, including agricultural productivity, supply chain function and food security.

Local food production can help improve food security and provide a food supply that is more resistant to outside disruption. Furthermore, agricultural and land management practices that emphasize stewardship of land, water, waste and other natural resources may be less vulnerable to climate change impacts such as drought and severe storms.

BUILDING ON EXISTING CITY EFFORTS. The city offers many unique programs and opportunities related to food systems, including several community gardens on publicly owned and managed properties. The Boise Urban Garden School (BUGS) program uses a $\frac{3}{4}$ acre organic garden and school-based community center gardens as a foundation for learning about gardening and food production. Boise is currently developing Spaulding Ranch, an agriculture-focused parks and recreation amenity. At the Twenty-Mile South Farm, biosolids are stored and applied to fields to improve soil health. The fields are used to grow forage crops that are subsequently marketed and sold.



QUICK FACTS



108

local farms supported by the Farmers Market (Boise Farmers Market, 2019)



6

community gardens managed by the City of Boise (City of Boise, 2020)



14

community gardens supported by the City of Boise (City of Boise, 2020)



22% decrease

in total land in farms in Ada County from 2012 to 2017 (U.S. Department of Agriculture, 2017)



8%

of Treasure Valley farmland is used to cultivate food crops for human consumption (U.S. Department of Agriculture, 2017)

IMPLEMENTATION PARTNERS

Listed below are some of the City of Boise departments and community stakeholders that could be involved in developing and implementing food system actions.

 CITY OF BOISE	 COMMUNITY GROUPS AND ORGANIZATIONS
<ul style="list-style-type: none"> Boise Urban Garden School (BUGs) Community Engagement Economic Development Finance & Administration Parks & Recreation Planning & Development Services Public Works 	<ul style="list-style-type: none"> Ada Soil & Water Conservation District Boise Farmers Market Boise State University Boise Urban Garden School 501(c)3 Global Gardens Healthwise Idaho Foodbank Neighborhood Associations Restaurants and Food Distributors Rolling Tomato Treasure Valley Food Coalition Treasure Valley Land Trust United Way of Treasure Valley University of Idaho Extension

OPPORTUNITIES

This roadmap details two opportunities to address the Food Systems climate action priority:

- 12. Local Food Security & Economy
- 13. Agriculture & Environmental Health



Here are some ways you can support the Food Systems climate action priority:

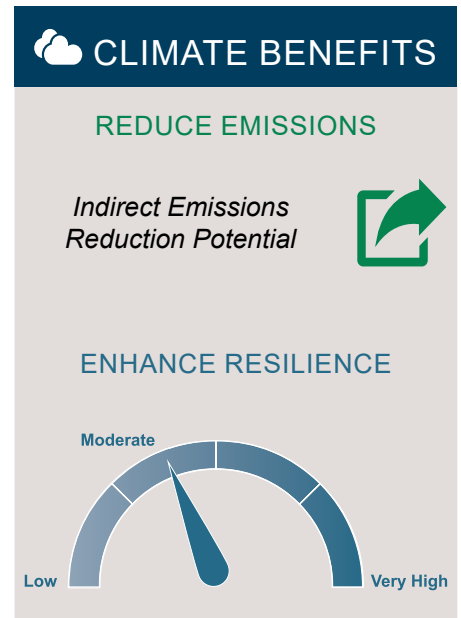
- When possible, purchase locally grown food and support local and regional agriculture.
- Establish a home garden or participate in a community garden.
- Support community food retailers and establishments that feature regionally produced foods.
- Consider food choices that emphasize healthy, climate-friendly and/or regional food products.
- Donate unused or excess food to food recovery organizations or food banks.
- Volunteer at a community garden or food bank.

12. LOCAL FOOD SECURITY & ECONOMY

This opportunity focuses on working collaboratively across sectors and organizations to expand the local food system and improve food security and access for Boiseans. It encourages growth of the local food economy, which includes food production, access, distribution, processing, sales, consumption, recovery and education. A robust local food economy helps reduce emissions associated with food transport, packaging, storage and disposal.

Food security and nutrition are place-based equity-related issues. Food access, food quality, and food education are also important determinants of health and wellness. In 2018, 9.1 percent of Ada County's population was food insecure (Feeding America, 2018) and approximately 5.6 percent of Boise households received SNAP benefits (U.S. Census Bureau, 2019). To increase food security, healthy and affordable food retail (e.g., farmers' markets, food stands) and local food production (e.g., greenhouses, community gardens) can be encouraged and targeted in areas with income disparities and service gaps. Education and assistance programs can help connect households with information about how to maximize resources, improve nutrition and support climate priorities.

Benefits of a strong local food system include reducing vulnerability to external supply chain disruptions and keeping money in circulation in the local economy. Furthermore, the food industry is an important part of the local job ecosystem, encompassing greenhouses, restaurants, food retailers, farmers markets, farm to table supply chains, and more.



TARGET

- ❑ Improve food security and grow the food economy by eliminating food deserts and increasing access to affordable and healthy food options.

ACTIONS

Near-Term Priorities

- ➡ Expand public and private community gardens and urban agriculture activities across the community, including engaging in partnerships for organizations to operate gardens on city-owned property.
- Determine if the city is interested in increasing its role in food systems-related activities. Expand resources, if needed, pending this outcome.
- Prioritize local food purchasing for city government functions

Longer-Term Priorities

- ➡ Support and advance a distributed model of local food sales and distribution, including but not limited to multiple farmers' markets, small farm stands, and neighborhood and mobile food pantries.
- Explore opportunities to leverage the geothermal energy for year-round food production (e.g., greenhouses).
- Complete comprehensive community and regional food system assessment and resilience strategy.

➡ Denotes existing actions that are already underway.

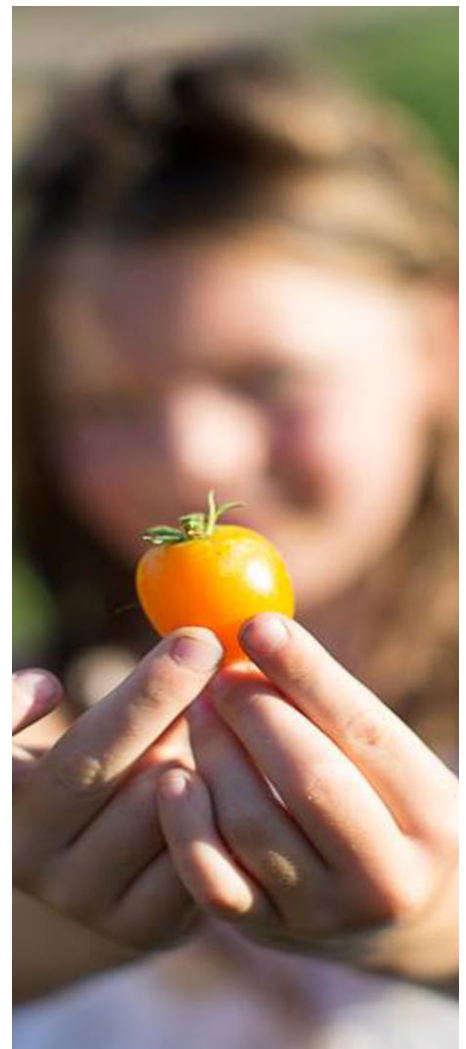
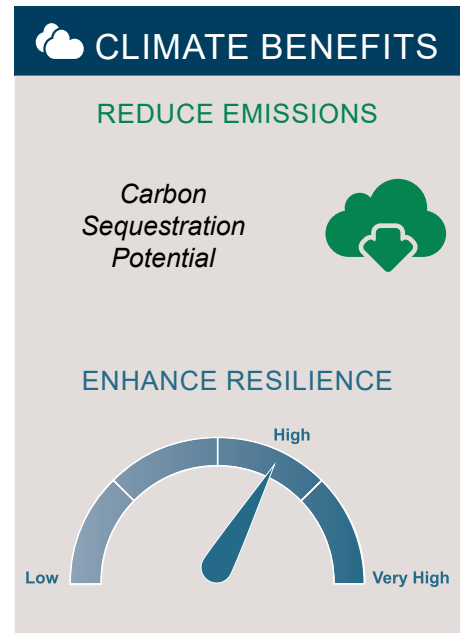
13. AGRICULTURE & ENVIRONMENTAL HEALTH

In Ada County, agricultural land accounts for 27 percent of land area (Ada Soil & Water Conservation District, 2020). While outside City of Boise jurisdiction, the region's working lands are essential components of the Boise food system and economy. Pressures from urban growth is leading to rapid conversion of farm and agricultural land, especially in the Treasure Valley area surrounding Boise. In response to these pressures, the city can collaborate to find creative solutions to support working lands and expand innovative farm and agricultural activities to keep these lands economically viable in agriculture.

Agriculture and farming activities contribute significantly to global GHG emissions and impact environmental resources including air, water quality, water supply and soil health. Adoption of regenerative land management and agricultural practices, such as low impact production, cover cropping, composting, increasing crop diversity, reducing or eliminating tilling, and managed grazing can help decrease environmental impacts. Regenerative practices also help sequester carbon (removal and storage of carbon dioxide from the atmosphere), reduce erosion, increase agricultural productivity, enhance soil health and improve water quality.

On Ada County farms, 1 percent farm organically, 4 percent use cover crops, 5 percent practice no tilling, and 3 percent practice reduced tilling (U.S. Department of Agriculture, 2017). Not only do city-owned properties, such as Spaulding Ranch and Twenty-Mile South Farm help keep land in agriculture, they can also pilot and research regenerative agriculture and land management practices. The city can continue to test and expand regenerative practices, on these properties and others, to support knowledge building, enhance environmental health, and generate economic opportunities.

Equity considerations associated with this opportunity include safe working conditions and livable wages for those who work in farming and agriculture. Potential health and wellness benefits connected to regenerative agriculture and land preservation include potential improvements to food nutrition content and improved air quality due to reduced dust and particulates.



- Leverage city resources to increase knowledge, understanding and use of regenerative agriculture practices.

ACTIONS

Near-Term Priorities

- ▣ Continue to improve food production and agricultural practices on properties owned or managed by the City of Boise such as Spaulding Ranch, Twenty-Mile South Farm and other city properties.

Longer-Term Priorities

- Establish and promote community events centered around the celebration of regional agriculture and food.
- Convene landowners, conservation groups, and regional jurisdictions to inventory agricultural lands, explore development pressures and identify solutions to keep land in agriculture.
- Explore opportunities to support regenerative agricultural practices.
- Explore opportunities to grow and diversify a carbon offset portfolio by partnering with local/regional agriculture producers.

▣ Denotes existing actions that are already underway.





NATURAL ENVIRONMENT

Emissions
Reduction
Emphasis



Resilience
Emphasis



This climate action priority elevates the role of the tree canopy in reducing urban heat island impacts. It also focuses on strengthening ecological systems and processes essential in helping Boise to be resilient to climate change risks and impacts. Finally, it focuses on open and green spaces, reinforcing their important roles in supporting community and environmental health.

BACKGROUND

ADDRESSING EMISSIONS THROUGH THE NATURAL ENVIRONMENT. Boise's GHG inventory does not separate out natural-environment-related emissions or currently quantify carbon sequestration benefits. Even so, the city's natural environment conservation efforts and parkland and open spaces present potential opportunities for carbon capture and storage.

ENHANCING CLIMATE RESILIENCE. Open spaces, river and stream corridors, natural habitats, wildlife, plants and soils are all vulnerable to the risks of a changing climate. At the same time, innovative solutions to protect and restore habitats and expand nature-based solutions can help reduce climate risks and improve the health and function of the natural environment.

For example, the urban tree canopy helps reduce heat island effects and decreases energy used to cool buildings, while also improving air quality and supporting pollinators and wildlife. Likewise, proactive conservation and restoration of wetlands can help reduce flood risk and improve water quality.

BUILDING ON EXISTING CITY EFFORTS. The city has an abundance of open space and parks resources that connect residents with the natural environment. The city has embarked on climate-adapted development - with parklands along the Boise River that are designed to accommodate seasonal flooding, and in the Wildland Urban Interface (WUI) - by focusing restoration and management efforts in areas identified as having high fire risk potential. In addition, future efforts in natural habitat restoration will address long term temperature impacts on the lower Boise River.



QUICK FACTS



55,000

park and street trees maintained by the City of Boise (City of Boise, 2020)



16% of the

community is covered by the urban tree canopy (City of Boise, 2020)



7,150 acres

of park and open spaces owned and managed by the City of Boise (City of Boise, 2020)



69% of Boise

residents live within a 10-minute walk of a park (Trust for Public Lands, 2020)

IMPLEMENTATION PARTNERS

Listed below are some of the City of Boise departments and community groups and organizations actively working to enhance and manage natural resources and ecosystems. They could be involved in developing and implementing natural environment actions.

 CITY OF BOISE	 COMMUNITY GROUPS AND ORGANIZATIONS
<ul style="list-style-type: none"> • Community Engagement • Boise Fire • Economic Development • Open Space & Clean Water Advisory Committee • Ridge to Rivers Partnership • Parks & Recreation • Planning & Development Services • Public Works 	<ul style="list-style-type: none"> • Boise State University • Boise River Enhancement Network • Conservation Voters for Idaho • Idaho Conservation League • Land Trust of the Treasure Valley • Sierra Club • The Nature Conservancy • Treasure Valley Canopy Network • Trout Unlimited, Ted Trueblood Chapter

OPPORTUNITIES

This roadmap details three opportunities to address the Food Systems climate action priority:

- 14. Urban Tree Canopy
- 15. Healthy Ecosystems
- 16. Access to Open Spaces



COMMUNITY IN ACTION

Here are some ways you can support the Natural Environment climate priority:

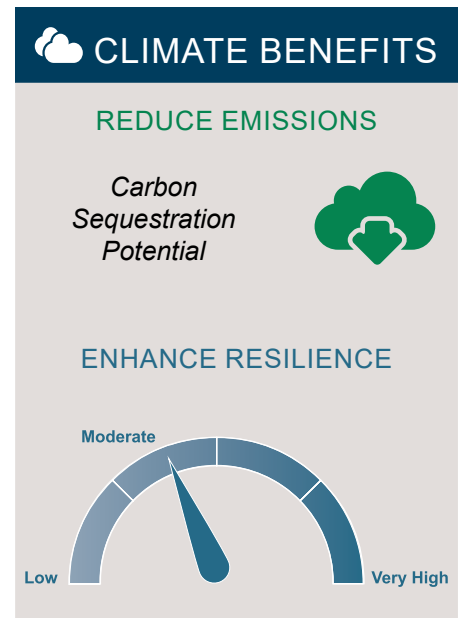
- Plant trees – See Boise’s City of Trees Initiative www.cityofboise.org/departments/parks-and-recreation/city-of-trees-challenge/ or Idaho Power’s Shade Tree Program
- Volunteer to protect/enhance natural areas in our community - Invasive species removal events, planting events, river cleanups, trail maintenance, etc. www.cityofboise.org/departments/parks-and-recreation/volunteer/

14. URBAN TREE CANOPY

Trees, a critical part of urban infrastructure, reduce urban heat and provide significant climate benefits. In 2020, the city embarked on the City of Trees Challenge to plant a new tree for every household across the city, totaling 100,000 trees by 2030. The challenge also aims to plant one sapling for every resident of the city, totaling 235,000 saplings in nearby forests. This will be achieved through extensive community involvement and collaboration with local, state, national and worldwide organizations.

Trees are essential in providing ecosystem services including enhanced energy efficiency, stormwater mitigation, improved water and air quality, wildlife habitat; and, they increase property values as well as provide human health benefits. An expanded urban tree canopy, created by the trees planted across the city, can benefit all community members

Trees also serve an important function in the local carbon cycle. According to the Treasure Valley Urban Tree Canopy Assessment, trees in Boise currently store an estimated 356 million pounds of carbon and sequester an additional 13 million pounds of carbon each year as they grow (Plan-it Geo, 2013). Additionally, Boise's trees provide an estimated \$485,000 in stormwater benefit, 5 million kWh in reduced summer energy use and 516,000 pounds of air pollutant removal annually (Plan-it Geo, 2013).



TARGET

- ❑ Plant 100,000 trees across the city by 2030.
- ❑ Plant 235,000 saplings in nearby forests by 2030.

ACTIONS

Near-Term Priorities

- ➡ Achieve Impact Certification for the City of Trees Challenge.
- ➡ Secure funding for and update the city's urban tree canopy assessment to measure progress by 2023.

Longer-Term Priorities

- ➡ Update the citywide tree inventory with current diameter classes and precise locations.
- ➡ Utilize the Clean City Index, when completed, to target areas of the city with lower tree canopy coverage for new plantings.
- Quantify structure and function of the community forest in riparian areas within Boise Open Space reserves and along the Boise River.

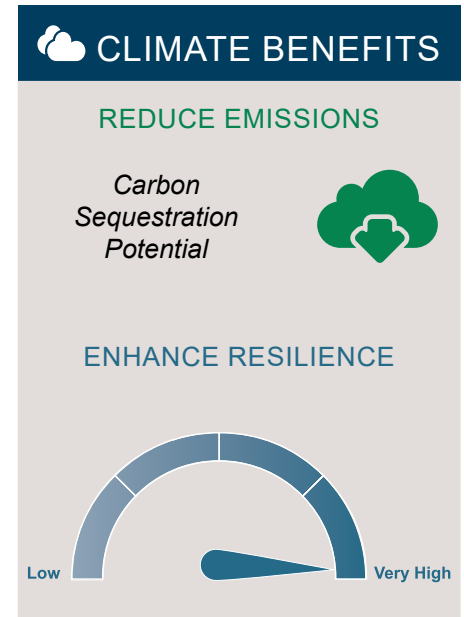
➡ Denotes existing actions that are already underway.

15. HEALTHY ECOSYSTEMS

This opportunity focuses on implementing conservation efforts on the city's parkland and open spaces. City parkland and open space reserves are home to diverse and imperiled ecological resources including wetlands, sagebrush, grasslands, riparian areas, rivers and native species. These areas sequester and store carbon and support a wide variety of ecological services including fire prevention, pollinator diversity, clean drinking water, clean air, and habitat for big game and more than 400 other native animal species.

Parkland and open spaces are critical components to climate resiliency related impacts including drought, extreme heat, wildfires, and flooding. Open space reserves are managed to mitigate the risks of fire impacts on public and private property and to improve the resiliency of native habitat in recovering from disturbance such as fire, invasive species, recreation and expected climate related habitat changes. In addition, parks along the Boise River have been intentionally designed to assist with flood management in high water years.

Robust planning and management, to ensure successful restoration and low impact solutions in parkland and open spaces, are critical to resiliency and carbon sequestration efforts. Increasing these efforts, including native species plantings, tree canopy enhancements and management efforts designed to promote pollinators are just a few ways the city can lead by example.



TARGET

- Increase restoration efforts in riparian areas and open space reserves.

ACTIONS

Near-Term Priorities

- ➡ Proactively create, protect and restore native vegetation communities and species habitat to provide ecosystem services on city government properties (including parks, open spaces, and other public properties).
- ➡ Expand efforts to protect, restore, enhance and maintain riparian areas and wetlands, and transitional and upland buffer areas.
- ➡ Align with national programs and initiatives on conservation by taking meaningful and appropriate action locally.
 - Complete mapping of high populations of invasive species and develop restoration plans for climate adapted landscapes.

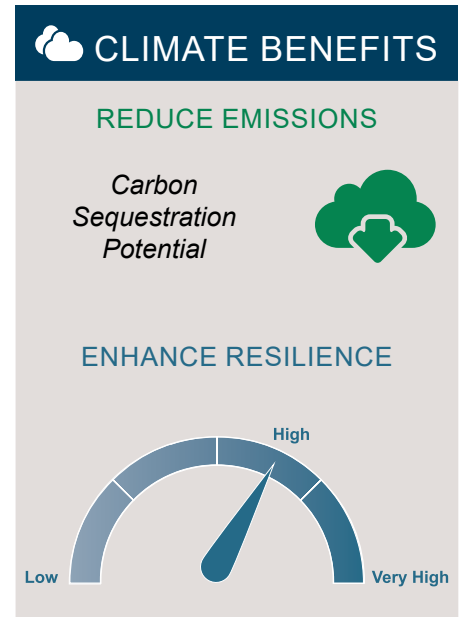
Longer-Term Priorities

- ➡ Continue to acquire open spaces, enhance habitats and restore native vegetation.
 - Provide for long-term viability of restoration efforts through increased monitoring and maintenance.
 - Manage land and resources to maximize carbon capture and storage.
 - Invest in wetland development and explore coordinated wetland banking opportunities.

16. ACCESS TO OPEN SPACES

Approximately 69 percent of City of Boise residents currently have access to a public open space within a ten-minute walk of their home (Trust for Public Lands, 2020). Parks and open space reserves provide opportunities for active living and recreation, support mental well-being, and help foster important social connections. A focus on improving connectivity and access to parks and other natural amenities can lead to human health benefits.

The city is currently undergoing a shift in how it measures park level of service and is striving to achieve a city where all residents live within a 10-minute walk of a park or open space. The city has an incredible opportunity to look at how to achieve these connections for the 31 percent of residents who do not currently live within a 10-minute walk of a park or open space. From increasing urban pathways and trail connectivity to increasing the number of small scale parklet options, opportunities for innovative ideas and new ways to connect residents to nature are at the forefront of this roadmap.



TARGET

- Increase opportunities for parks and open space connectivity while balancing protection of native habitat and species.

ACTIONS

Near-Term Priorities

- ➡ Continue to lead the Ridge to Rivers partnership and enhance access to trails and public land from neighborhoods.
- ➡ Formalize standards for park access using identified strategies for achieving connectivity to parks, open space and the natural environment.

Longer-Term Priorities

- Identify general locations of new connections to parks and open spaces that will add to the number of residents with access to a park within a 10-minute walk of where they live.
- Identify funding sources for implementing the vision of a 10-minute walk to parks and open spaces.

➡ Denotes existing actions that are already underway.



THE BOISE RIVER

The Boise River is a valuable ecological, recreational and economic asset for the community. It is a vital thread that weaves together many of the city’s climate priorities. The Boise River connects us through our personal stories. Stories that span time and culture, commonly identify the Boise River as a vital life source. Residents and businesses alike have livelihoods that depend on access and equity to the Boise River as an intersectional resource.



THE BOISE RIVER CONNECTION

<p>PRIORITY: TRANSPORTATION</p>	<p>The 25-mile BOISE RIVER GREENBELT pathway is one of the most widely used amenities in the Treasure Valley. A favorite of bikers, skaters, walkers and runners, it also accommodates commuters who welcome an alternative transportation route.</p>
<p>PRIORITY: NATURAL ENVIRONMENT</p>	<p>The trees along the Boise River corridor provide SHADE, WILDLIFE HABITAT AND STREAMBANK STABILIZATION. The Boise River Greenbelt is one of Boise’s most beloved parks. The tree-lined pathway follows the river through the heart of the city and provides scenic views, wildlife habitat and pedestrian access to many of the city’s popular riverside parks.</p>
<p>PRIORITY: WATER</p>	<p>Every day the city treats and cleans over 30 million gallons of used water before putting it into the river. As regulations increase and climate change impacts on the water supply, the city is preparing for how to continue to protect the Boise River and precious supply of water. With the threat of drought increasing, the water that is discharged to the river presents an opportunity to renew and recycle water to create a more SUSTAINABLE AND DROUGHT-RESISTANT WATER SUPPLY.</p>

For every personal story, the roadmap implementation strives to improve equity, human health and wellness, grow a climate economy, and expand community action. Successful roadmap implementation will account for all Boise River users and engage a full range of stakeholders in opportunities and action that intersect.

“Living and playing near the Boise River is what makes our community special. The river is where I go to relax and enjoy time in nature. As an educator, I strive to provide my students with learning opportunities that will empower them to appreciate and protect this special area we call home.”

Misha Smith

“The Boise River is not a mere liquid commodity, it’s our ultimate connection to the cosmic circle of life. That’s why for many years I’ve dreamed of bringing Christopher Swain to Idaho to swim the entire river from its source in the Sawtooths Mountains to where it joins the Snake River. Finally in 2019, with the help of Heather Dermott & Idaho Business for the Outdoors, my dream became a reality. Now I encourage everyone to dream big and always go with the flow.”

Dick Jordan

“Even as everything else changes as I get older, the Boise River has always remained a constant. As a child, my family would go on evening bike rides along the river. My friends and I would float the river on the hottest summer days. All these years later I watch it flow from the third floor of the library as I work towards my degree at Boise State. To me, the river has always been a place of contentment and relaxation. Climate action is absolutely crucial to protect this special place for many more years to come.”

Emily Her



WATER

Emissions
Reduction
Emphasis



Resilience
Emphasis



The City of Boise is facing many challenges to the availability and resiliency of its water supplies, including growth and climate change. This climate priority emphasizes water conservation as a primary focus to reduce water demand. It also stresses an integrated water management approach to address water supply, water quality and stormwater management in the context of a changing climate.

BACKGROUND

REDUCING EMISSIONS FROM WATER. Water treatment, conveyance and renewal are extremely energy intensive. Emissions associated with these activities are largely captured in the energy sector of the city's GHG inventory. These water activities also generate methane and other direct emissions. In 2018, 0.5 percent of community GHG emissions were from wastewater treatment.

ENHANCING CLIMATE RESILIENCE. Of the eight areas of risk identified in the Boise Climate Adaptation Assessment (University of Idaho, Boise State University, Langdon Group, 2016), six involve water resources: heavy precipitation days, irrigation demands, drought frequency, seasonal stream flows, flooding danger and water quality.

The frequency of moderate and exceptional drought is projected to increase in Boise. Climate changes to watershed hydrology causes more of the annual precipitation to fall as rain instead of as snowpack during the winter. The early precipitation causes higher likelihood of flood flows, but the baseflow is lower and lasts longer than with normal hydrology. In short, anticipated climate change impacts include both increased flood risk and later drought. Furthermore, drought and water availability relate to water quality, with warm, slow-moving waters closely linked to overgrowth of cyanobacteria (e.g., blue-green algae).

BUILDING ON EXISTING CITY EFFORTS. In 2020, the Water Renewal Utility Plan (Brown & Caldwell, 2020), a 20-year strategic plan for the city, was approved. The Water Renewal Utility Plan prioritizes recycled water in the future, to keep water local and bolster long term water resilience. The Recycled Water Program is a new component of Water Renewal Services that encompasses collection, treatment and distribution of recycled water. Community outreach, research and regulatory efforts will comprise the initial stages of this work. The program is anticipated to culminate in construction of a third Water Renewal Facility as well as collection pipelines and recycled water distribution infrastructure.



QUICK FACTS



0.5% of community GHG emissions are from wastewater treatment (City of Boise, 2018)



176 gallons per capita per day (GPCD) average water use for United (SUEZ) Water customers (SPF Water Engineering, LLC, 2016)





10 billion gallons of water renewed annually by the City of Boise



20% growth in renewed water expected in the next 20 years (Brown & Caldwell, 2020)

IMPLEMENTATION PARTNERS

Listed below are some of the City of Boise departments and community groups and organizations that could be involved in developing and implementing water actions.

 CITY OF BOISE	 COMMUNITY GROUPS AND ORGANIZATIONS
<ul style="list-style-type: none"> • Community Engagement • Open Space & Clean Water Advisory Committee • Parks & Recreation • Partners for Clean Water • Planning & Development Services • Public Works 	<ul style="list-style-type: none"> • Boise State University • Canal Companies and Irrigation Districts • Capitol Water • Federal and State Agencies (Bureau of Reclamation, Idaho Water Resources) • Other Municipalities in Treasure Valley • SUEZ Water

OPPORTUNITIES

This roadmap details three opportunities to address the Water climate priority:

- 17. Water Conservation
- 18. Water Supply Resilience
- 19. Water Quality, Stormwater Management & Flooding



COMMUNITY IN ACTION

Here are some ways you can support the Water climate priority:

- Take action to reduce water consumption in your home or business by adjusting faucets and fixtures.
- Consider xeriscape, instead of a traditional lawn, to reduce water consumption from irrigation.
- Help address stormwater pollution: <https://www.partnersforcleanwater.org/>

17. WATER CONSERVATION

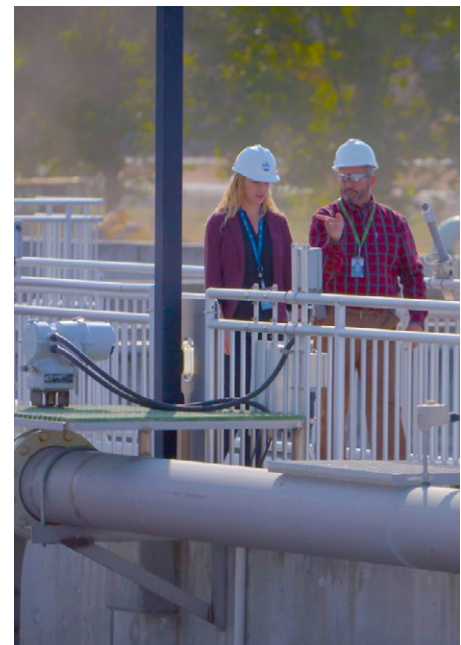
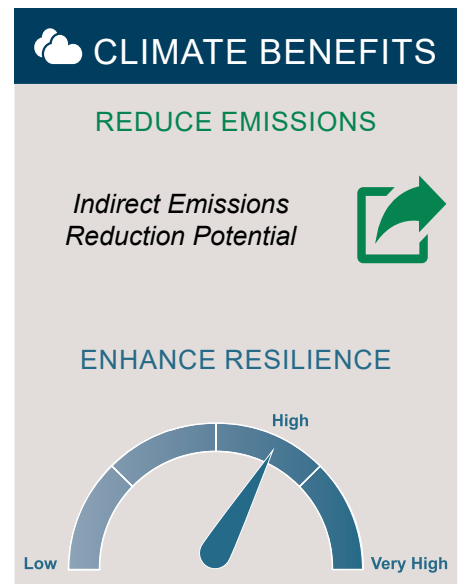
As droughts increase in frequency and severity, and the region's population continues to grow, water conservation and efficient water use will become increasingly important. Water will become more valuable as it becomes more scarce.

This opportunity focuses on improving water conservation and efficiency measures as a primary means to reduce overall water demand. It targets a reduction in residential water use to align with residential water consumption rates in other arid and western states. Addressing water sources, irrigation systems, indoor water-fixtures and water-consuming behaviors provides pathways to achieve this target.

Water efficiency in commercial and industrial sectors is also important and presents significant opportunity for a reduction in total water consumption. Establishing quantitative efficiency targets for these sectors is more complex; but, tracking water consumption, modernizing industrial processes, upgrading irrigation systems and updating indoor fixtures can lead to increased efficiency. The city can act as a leader on water resource conservation and set internal water conservation targets that inform a community standard.

Demands placed on water systems due to climate change will likely increase future water costs. As with energy cost burden, water cost burden and efficiency upgrades are important to examine from an equity perspective, as those who may benefit most from water efficiency measures and system improvements may be least able to afford them.

As water cost increases, water efficiency projects will likely yield a positive return on investment and can create or grow jobs in the landscaping and plumbing trades. Furthermore, the Water Renewal Utility Plan identifies both the significant infrastructure upgrades and changes needed to meet the demands of the community in the context of climate change challenges and opportunities to create jobs.



TARGET

- Calculate current per capita daily water use and set a water reduction goal for Boise city residents and city-owned facilities.

ACTIONS

Near-Term Priorities

- ➡ Update development regulations to promote water-conserving landscaping that will absorb rainfall, sequester carbon and reduce the urban heat island effect.
- ➡ Create a new water efficiency program to support households with low incomes - to meet water efficiency goals.
 - Increase education about water conservation opportunities.
 - Partner with municipal water providers to measure and report household per capita water use to the public annually.

Longer-Term Priorities

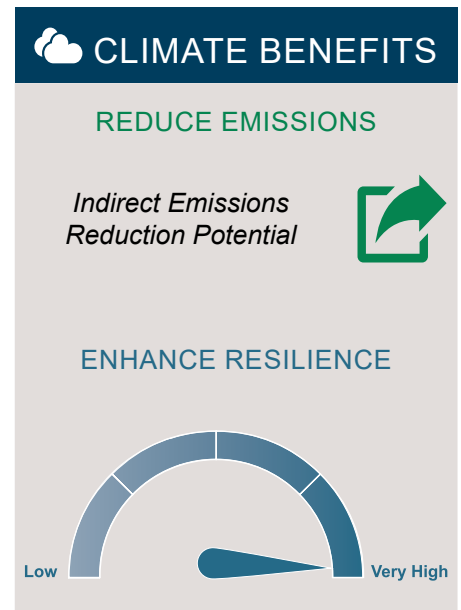
- ➡ Complete indoor and outdoor water efficiency improvements for city government facilities and properties.
 -
 - Encourage and incentivize water-efficient landscape conversions on private property.
 - Consider how greywater could be implemented as a solution for outdoor irrigation.

➡ Denotes existing actions that are already underway.

18. WATER SUPPLY & RESILIENCE

A resilient water supply necessitates an integrated, coordinated, diversified approach to water resource planning and management. Diversifying the city's water sources, storage and conveyance options is key to long-term resiliency.

Boise's water supply is a combination of groundwater and surface water from the Boise River. Potable/indoor water is largely provided by Suez Water Company, with the exception of customers in the Capitol Water Corporation, those with private wells, or private companies serving homeowners associations. Irrigation/outdoor water is provided by either Suez Water Company, Capitol Water, a private well, or a canal company or irrigation district. Boise's Recycled Water Program is a new component of Water Renewal Services that encompasses collection, treatment and distribution of recycled water.



Boise’s water supply planning focuses on integrated water management, meaning that all water has value and is interconnected. Water passes through the jurisdictions of numerous entities as it migrates through the Treasure Valley. Consequently, water must be managed collaboratively to most effectively use, reuse and repurpose the finite supply. Following “One Water” principles will maximize the entire city water resource portfolio to ensure the quantity and quality of the city’s water supplies are both resilient and sustainable.

Boise’s water supply planning also emphasizes the right water for the right use. Water resources planning for climate change focuses on fit-for-purpose strategies that match the quantity and quality of water required for each specific use, to maximize cost and supply efficiencies. For example, the use of treated water for applications such as outdoor landscaping may not represent the highest and best use for this water. Similarly, renewed water may be more appropriate for some applications, such as industrial processes, than the use of surface or groundwater.


Implementation of these approaches can help reduce water stress as well as create job opportunities.

TARGET


- Preserve groundwater for drought conditions.
- Secure additional surface and groundwater storage.
- Provide active aquifer management with aquifer recharge.
- Invest in additional recycled water programs.

ACTIONS

Near-Term Priorities

-  Increase education about water supply, demand and renewed water opportunities.
 - Develop a regional water resources planning group to explore partnerships to develop collaborative policies and water use practices (e.g., policy and planning discussions with local water providers to partner on a regional recharge program combining each partners’ unique water supply and infrastructure assets for mutual benefit).

Longer-Term Priorities

-  Explore implementation of the water renewal infrastructure, industrial recycled water and aquifer recharge strategies from the Water Renewal Utility Plan.
 - Pursue acquisition of water rights to increase low flow scenarios in the Boise River.
 - Convert potable water use for irrigation to surface water where available. This practice would result in an overall reduction in city facility and residential water use.
 - Consider ordinance changes that require new homes without a surface water irrigation supply to install xeriscaping and develop a parallel conversion program for existing homes.
 - Collaborate with irrigation and canal companies to explore ways to optimize use of water flowing through the system.

 *Denotes existing actions that are already underway.*

19. WATER QUALITY, STORMWATER MANAGEMENT & FLOODING

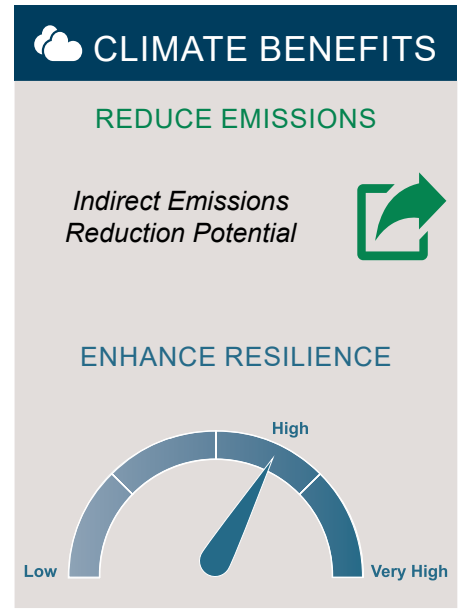
This opportunity focuses on addressing the water quality, stormwater, and flooding vulnerabilities associated with a changing climate. Climate change in the Treasure Valley is predicted to impact precipitation amounts and timing. The precipitation is more likely to be rain instead of snowpack and will occur earlier in the year (when it is not usable for irrigation purposes). Because of Boise's arid climate and seasonal rainfall, combined with proactive management with land development, stormwater management issues have not been as significant as in other parts of the country. However, as stormwater requirements evolve and land development becomes more dense, proactive and effective stormwater management will become more important.

Earlier mountain snowmelt, increased evaporative demand and extended periods of warm and dry conditions during the summer months are projected to result in further declines in low flows in the Boise River. Conditions detrimental to water quality and aquatic life are expected to increase substantially, with a 400 percent increase in the frequency of what are historically considered low flow levels by mid-21st century (University of Idaho, Boise State University, Langdon Group, 2016). In addition, water quality is likely to be affected by climate change impacts. For example, higher temperatures and lower stream flow may increase the growth of algae (including harmful algal blooms) or pathogens in reservoirs. To anticipate and address these changes, the city can contribute to improvements that expand monitoring and maintenance of ground water and surface water (source water for drinking water) quality throughout the basin.

This opportunity also focuses on natural solutions to water quality, stormwater management and flood control. It emphasizes approaches that help natural processes and systems adapt to changing conditions, such as green stormwater infrastructure in urbanized areas, and protecting and restoring streamside vegetation buffers, wetlands and headwaters to help filter pollutants and reduce the inflow of urban runoff. Wetlands naturally improve water quality and habitat by filtering nutrients, dropping out sediments, sequestering carbon and reducing water temperature.

Focusing on improving water quality and reducing pollution can help address equity and environmental justice concerns which, in many parts of the country disproportionately impact frontline and underserved communities. While this may not be the case in Boise, efforts in this area can help build trust and identify concerns. And, improved water quality and reduced pollution carry tremendous health benefits for humans and other living creatures that depend on water.

Finally, stormwater flows are closely linked to water quality and water quantity considerations. As Boise prepares for changing stormwater and flooding patterns, it is increasingly important to address unregulated sources of water pollution since only natural rainfall/runoff is regulated under stormwater regulations. This includes controlling runoff from residential lawns and commercial landscaping, as irrigation runoff is one of the most polluting sources to water quality but is unregulated.



- Implement water quality, stormwater management and flood control programs to protect water resources, reduce impacts to property and achieve compliance with regulatory requirements and other intended outcomes.

ACTIONS

Near-Term Priorities

- ➡ Implement water quality and green stormwater infrastructure projects in accordance with the Municipal Separate Storm Sewer System (MS4) Stormwater Discharge Permit.
- ➡ Expand support for local water quality efforts, through outreach about recycled water and source water quality.
- ➡ Continue to maintain foothills flood containment facilities such as the Cottonwood flood ponds and flume.
- ➡ Maintain Boise's compliance and good standing under the National Flood Insurance Program and explore opportunities to increase the Community Rating System (CRS) rating.

Longer-Term Priorities

- ➡ Implement programs and regulations to protect source water.
- ➡ Research, design and implement multi-benefit flood protection projects, such as green infrastructure, to increase channel conveyance capacity and protect or improve ecosystem resilience.
- ➡ Explore implementation of river discharge and enhancement strategies from the Water Renewal Utility Plan.
 - Work with drinking water providers to identify current groundwater pollutants and sources.
 - Evaluate ongoing potential sources of contamination and current practices to protect water quality (e.g., UST, gas stations).
 - Expand participation in collaborative projects focused on protecting and improving imported source water quality.
 - Expand city regulations or best management practices (BMPs) to protect the Boise River corridor and tributaries/ponds that flow into the Boise River (e.g., filter strips, setbacks on waterbodies, education on fertilizer use).
 - Identify and eliminate barriers to and promote stormwater capture and use.
 - Continue to obtain land in areas vulnerable to flooding for the purpose of improved flood protection and channel restoration.
 - Create natural floodplain areas, stream-upland transition areas, and upland buffers around streams.
 - Explore potential uses of urban runoff as a resource for water supply that may be used to water areas downstream.
 - Evaluate a city sediment and erosion control program and update to accommodate changes that may occur due to increased, heavier precipitation events.

➡ Denotes existing actions that are already underway.



INNOVATION & ENGAGEMENT

Emissions
Reduction
Emphasis



Resilience
Emphasis



The opportunities in this climate priority focus on creating the necessary change-management strategy to become carbon neutral community-wide. They emphasize building and investing with the future in mind, and ongoing climate change education, outreach and communications. The opportunities also elevate the city’s role in advocacy and innovation to achieve Boise’s climate goals.

BACKGROUND

REDUCING EMISSIONS THROUGH ADVOCACY AND INNOVATION.

To become carbon neutral, innovation is needed to reduce or offset the harder to reach emissions sources for which cost-effective commercially available technologies are still under development. Innovation will also spark creative ways to scale and accelerate existing efforts and new opportunities.

Most importantly, advocacy and cross-cutting partnerships are needed to influence climate action policies that are outside of Boise’s direct control but necessary to become carbon neutral.

ENHANCING CLIMATE RESILIENCE THROUGH AN INTEGRATED APPROACH.

Making smart choices now will protect residents from increased health and economic risks due to climate change. To achieve community resilience goals, an integrated approach helps address climate vulnerabilities holistically across critical community infrastructure and facilities, creating solutions that solve for multiple issues at once

BUILDING ON EXISTING CITY EFFORTS IN ADVOCACY, ENGAGEMENT AND EDUCATION.

The city has been working on climate action for many years; and, in 2020, Mayor McClean announced the formation of the City of Boise Climate Action Division. Listed below are some examples of current city advocacy and education efforts.

Advocacy:

- The City of Boise participates in Idaho Power’s Energy Efficiency Advisory Group and the Integrated Resource Plan Advisory Council
- Several national climate and sustainability related organizations

Education and Engagement:

- Youth Climate Action Council
- Development of a Climate and Water Science Center
- Climate Stories
- Livability Ambassador Program
- Other community activities around sustainability, education and climate (e.g., scavenger hunt, water-wise classes, special events)

The City of Boise is looking to add new education and engagement opportunities and adjust existing programs to meet expanded climate education needs.

QUICK FACTS



Up to 15%

of community GHG emissions are from harder-to-reduce sources for which cost-effective commercially available solutions are still emerging, such as construction equipment and backup power generators



69%

of Idahoans think climate change is happening (The Nature Conservancy, 2020)




More than 62%

of Idahoans believe climate change is an issue that can be solved if everyone works together (The Nature Conservancy, 2020)

IMPLEMENTATION PARTNERS

Listed below are some of the City of Boise departments and community groups and organizations that could be involved in developing and implementing innovation and engagement activities.

 CITY OF BOISE	 COMMUNITY GROUPS AND ORGANIZATIONS
<ul style="list-style-type: none"> • City Council • Community Engagement • Economic Development • Finance and Administration • Mayor's Office • Public Works 	<ul style="list-style-type: none"> • Ada County Emergency Management • Boise State • Boise School District • Conservation Voters of Idaho • Idaho Power • Idaho Clean Energy Association • Idaho Conservation League • Sierra Club

OPPORTUNITIES

This roadmap details four opportunities to address the Innovation & Engagement climate priority:

- 20. Resilient Development & Infrastructure Design
- 21. Community Engagement & Education
- 22. Climate Advocacy
- 23. Carbon Offsets & New Technologies



COMMUNITY IN ACTION

Here are some ways you can support the Innovation & Engagement climate action priority:

- Advocate for changes in state and federal policies that support climate action and initiatives.
- Calculate your household carbon footprint and look for ways to reduce and then offset your emissions.
- Communicate with your elected officials about climate action policies you support
- Stay informed on climate action through local events and educational opportunities

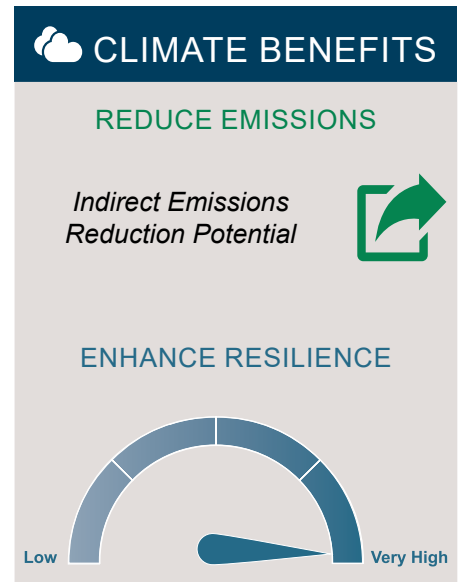
20. RESILIENT DEVELOPMENT & INFRASTRUCTURE DESIGN

Making smart choices now, with future changes in mind, will help buildings and infrastructure withstand chronic climate stressors as well as more frequent and severe hazard events brought on by climate change. Building on the Boise Climate Adaptation Assessment (University of Idaho, Boise State University, Langdon Group, 2016) and the Ada County Multi-Hazard Mitigation Plan (Ada County, 2017), this opportunity focuses on improving community critical infrastructure, as well as general new development practices, to be more resilient to Boise's top climate risks. The key components of the opportunity include:

- **PLANNING AND ANALYSIS:** Assessing assets against vulnerabilities and identifying priorities for protecting community members and critical community functions during hazard events.
- **EDUCATION AND AWARENESS:** Arming builders and the development community with information about expected climate impacts over the project life and how to build with the future in mind.
- **RESILIENCE CENTERS AND DEMONSTRATION SITES:** Building a network of community shelters and resilience demonstration sites, with the city leading the way in resilience (in city government facilities).
- **BACK-UP POWER AND TELECOMMUNICATIONS:** Employing smart technologies in energy and communications for hardening infrastructure needed during hazard events.
- **ROADS AND CIVIL INFRASTRUCTURE:** Ensuring these critical functions are designed and maintained with climate stressors in mind.
- **RETROFITTING OR RELOCATING AT-RISK STRUCTURES:** Including an increased number of shelters believed to be at increased risk of flooding from high precipitation events.

TARGET

- All future public infrastructure projects establish climate resilience as a primary design objective.



ACTIONS

Near-Term Priorities

- ▣➔ Maintain an inventory and condition assessment of critical city government facilities, community centers and critical infrastructure.
- Develop an education and awareness campaign for contractors and designers to advance the resilience conversation throughout building and energy sectors.
- Consider back-up power, mobile power generation, fuel storage and communications redundancies for critical buildings and infrastructure.

Longer-Term Priorities

- Integrate resilience planning and climate vulnerability considerations in city government facility and infrastructure siting, orientation, design, construction and operations.
- Create a demonstration project, at a critical public facility, that showcases structural and operational resilience (including renewable energy plus storage).
- Coordinate and develop waste management and response protocols under various climate hazard scenarios.
- Arrange a network of distributed and accessible community “resilience centers” (including but not limited to publicly accessible spaces with access to air conditioning during heat waves and/or heat during winter storms).

▣➔ *Denotes existing actions that are already underway.*



21. COMMUNITY ENGAGEMENT & EDUCATION

The climate priorities and opportunities throughout this roadmap are infused with actions to help increase education and awareness on the topic at hand, as well as topic-specific partnerships for engagement. This opportunity is intended to support these subject-specific types of actions by raising the overall climate action knowledge, capacity and engagement level in the community. In coordination with community partners, this will create a cohesive education and messaging approach that makes it easier for community members to take individual action.

Key tenets of impactful community engagement and education on climate action include igniting enthusiasm, leveraging personal stories and lived experiences, and facilitating collaboration and capacity-building. Boise is a welcoming community made up of people from many different backgrounds and, as such, climate-related education and engagement should be available in multiple languages. Furthermore, residents deserve to have a city government that is responsive, open and inclusive. Through its climate education and engagement efforts, the city can continuously seek opportunities to understand community needs to maximize impact.

TARGET

- Raise the overall climate action knowledge and engagement level in the community.

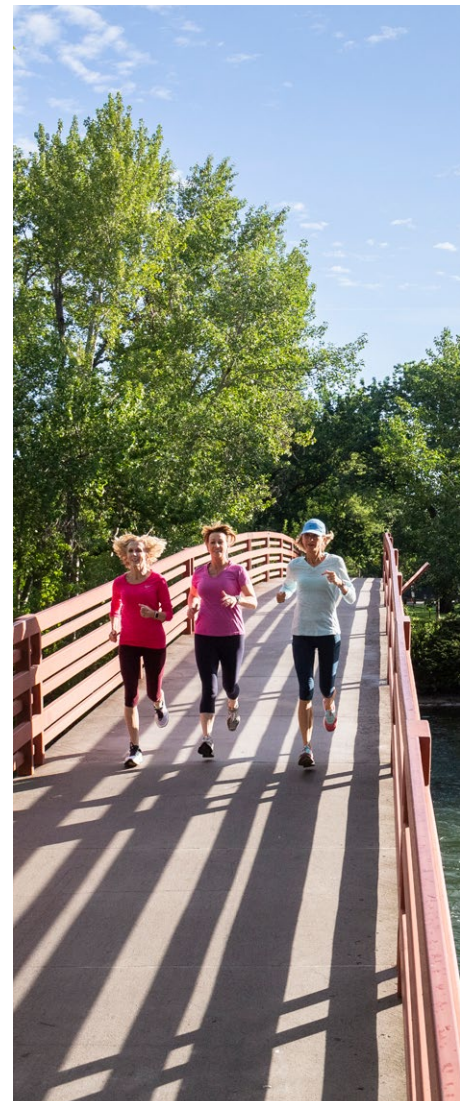
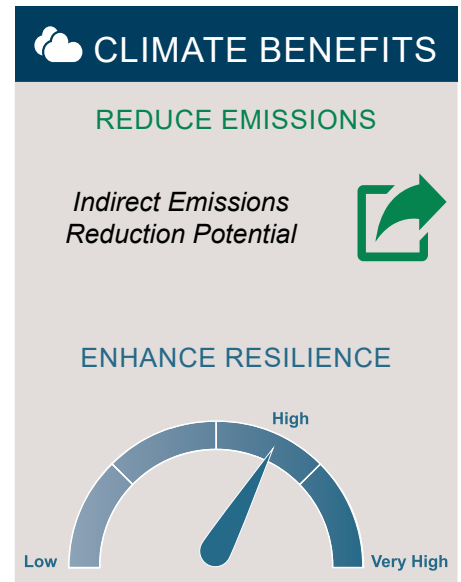
ACTIONS

Near-Term Priorities

- ➡ Conduct ongoing climate change education and outreach.
- ➡ Establish and convene a youth climate action council and a climate ambassador program to receive community feedback and ideas for priorities and implementation.
- ➡ Identify and incorporate new approaches to ensure the city's climate communication and engagement activities reach a broad audience, including residents who don't typically interact with government.
 - Expand translation services for climate-related communications and engagement materials and activities.

Longer-Term Priorities

- ➡ Continue opportunities to implement or expand diversity, equity, and inclusion assessments and initiatives with community partners.
 - ➡ *Denotes existing actions that are already underway.*

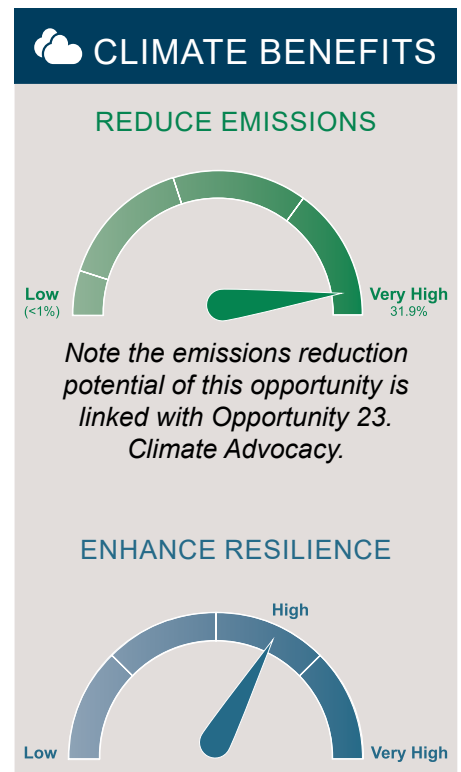


22. CLIMATE ADVOCACY

Not all of Boise’s GHG emissions are within the community’s direct control. Like Boise, many U.S. Cities are realizing that their GHG emissions are tied to regional, state, and national factors, and that through advocacy they have an opportunity to influence these factors. Policy changes at the regional, state, and federal levels, have potential to significantly reduce Boise’s GHG emissions. Many advocacy efforts include climate justice considerations to address inequities in climate impacts and access to opportunities.

This opportunity addresses partnerships on three scales to influence emissions-reduction policies and practices outside of Boise’s direct control:

- **CONTINUED COLLABORATION WITH IDAHO POWER** – to support the utility’s commitment to 100 percent clean electricity and plan for new uses of clean electricity in Boise such as the infrastructure needed to support electric vehicles and clean heating technologies.
- **LEGISLATIVE POLICY AGENDA** – work with legislators on Boise’s climate priorities with the greatest emissions reduction potential – including building codes, motor fuel taxes and utility regulation.
- **CITY COALITIONS WORKING ON FEDERAL ADVOCACY** – join forces with other U.S. Cities with GHG reduction goals to advocate for a federal price on carbon and stricter emissions standards from vehicles, appliances, consumer goods and federally regulated industries including aviation.



TARGET

- Advocate for local, state and federal actions that will reduce GHG emissions in Boise.

ACTIONS

Near-Term Priorities

- ➡ Work with Idaho Power for Public Utilities Commission (PUC) approval to retain all renewable energy credits (RECs) associated with its resource mix.
- Establish an annual legislative policy agenda that advances city government climate priorities and positions.

Longer-Term Priorities

- Join local government and non-governmental organization coalitions to work on advocacy and policy change around key transportation and climate efforts (e.g., emissions standards in the airline industry, federal vehicle emissions standards, appliance efficiency standards).
- Advocate for state and federal incentives and funding mechanisms to support EV and fuel-efficient vehicle/equipment adoption.

➡ Denotes existing actions that are already underway.

23. CARBON OFFSETS & NEW TECHNOLOGIES

Up to 15 percent of community GHG emissions are from difficult-to-reduce sources for which cost-effective commercially available solutions are still emerging. This opportunity looks first to developing new technologies locally for reducing these harder-to-reach emissions. This not only supports Boise’s research institutions but also helps attract investment and new clean tech businesses to Boise. This builds on the city’s strategic goal to create a Climate Economy Accelerator/Incubator. For any remaining GHG emissions gap, this opportunity looks at the feasibility, timing and role carbon offsets might play in becoming carbon neutral.

TARGET

- ❑ Invest in new technologies and purchase carbon offsets as necessary to address GHG emissions that are not technically or economically feasible to mitigate.

ACTIONS

Near-Term Priorities

- ➡ Advance feasibility, funding and implementation planning for Climate Economy Accelerator/Incubator.
- ➡ Integrate near-term climate action priorities into the annual city budget development process.
- ➡ Continue identification of collaboration opportunities with the Idaho National Lab.

Longer-Term Priorities

- Develop city government standards and procurement guidelines for carbon offset investments and timeline for purchases.
- Determine a funding model for investing in and purchasing carbon offsets to meet near-term climate goals.
- Explore development of a climate action-focused job skills training center (possibly in coordination with Climate Economy Accelerator/Incubator or other local educational and workforce development organizations).
- Calculate sequestration benefits associated with urban forestry, urban agriculture, and open and green spaces; factor into overall carbon budget.

➡ Denotes existing actions that are already underway.





COMMUNITY ENGAGEMENT



Community Conversations

The City of Boise aims to be people-centered and foster two-way conversations that engage those who live, work and play in Boise as trusted partners in identifying and tackling issues of importance. We will advance the City of Boise’s mission by involving the community in implementation of the roadmap. We will fiercely seek opportunities for collaboration, remain accessible and transparent, elevate underrepresented voices, and build on our residents’ passion for Boise and desire to shape their future. In alignment with the roadmap’s guiding principles, the city will work with community partners to develop a range of opportunities for community members to access information, provide feedback, and increase meaningful and authentic civic participation through our climate priorities and opportunities.

COMMUNITY OPPORTUNITIES

BOISE’S ENERGY FUTURE	BOISE’S ENERGY FUTURE is focused on setting measurable and achievable renewable energy and efficiency goals for the entire city. Switching to clean electricity will support Boise’s economy. We will invest in local clean energy sources and the transition will help us reduce reliance on fossil fuels from other states and foreign countries.
BEE (BOISE ENVIRONMENTAL EDUCATION)	The City of Boise is dedicated to providing its citizens with opportunities to learn about our unique local environment and ways to live sustainably. BOISE ENVIRONMENTAL EDUCATION (BEE) is a multi-agency partnership providing environmental lessons and programs to children and adults.
KEEP BOISE MOVING	KEEP BOISE MOVING supports an efficient transportation system to meet the changing needs of the community while also sustaining high livability and a robust economy.
COMMUNITY CONVERSATIONS	COMMUNITY CONVERSATIONS are opportunities for Boise residents to talk about key issues through facilitated small and large group conversations to help inform future policy decisions.
ENERGIZE OUR NEIGHBORHOODS	ENERGIZE OUR NEIGHBORHOODS is a community collaboration to make all Boise neighborhoods unique and desirable. By aligning resources, we can improve livability and make measurable change.
VOLUNTEERS AND AMBASSADORS	VARIOUS PROGRAMS invite community members to participate in a various lessons, tours, events, and discussions designed to expand knowledge about the city’s vision and goals around climate and connectivity with others.



BOISE WATERSHED

In fall 2022, the Boise WaterShed will transition into a climate and water science center. Believed to be the first of its kind in the nation, this major shift will provide needed engagement with the community about their role in helping the city become more resilient to climate change impacts. It will inspire and empower the next generation of climate leaders. The exhibits and programming will reflect the new mission: Increasing climate change water awareness and inspiring action by teaching people of all ages how to protect and conserve our precious natural resources for future generations.

YOUTH CLIMATE ACTION COUNCIL

The City of Boise is seeking to bring new voices to the table to tackle climate solutions by launching the city's first-ever Youth Climate Action Council. The group is made up of students from across the city to represent our community and plan for a resilient future. Council members will work with City of Boise staff to create a community action project and act as an ambassador for climate change action to their schools and community. Through this work, the council will empower a future generation of leaders and community voices.





THE ROAD AHEAD

This roadmap establishes Boise’s climate vision, guiding principles, priorities and opportunities. It is not a detailed manual designed for implementation. Boise will rely on four tenets to navigate the road ahead.

According to the 2018 Special Report by the International Panel on Climate Change (IPCC), “global warming is likely to reach 1.5° Celsius (C) between 2030 and 2052 if it continues to increase at the current rate” (IPCC, 2018). The worst impacts of climate change may be avoided if global temperature rise can be kept within 1.5°C above pre-industrial levels. Limiting global warming to 1.5°C will require “**rapid, far-reaching, and unprecedented changes in all aspects of society**” (IPCC, 2018). While Boise alone cannot tackle this challenge, bold and quick local efforts will help catalyze the necessary societal changes.

This roadmap serves as a strategic guide for city government and our community to accelerate community climate action in Boise. Climate action encompasses activities related to both reducing greenhouse gas (GHG) emissions and increasing community resilience to a changing climate.

ACCELERATE IMPLEMENTATION

The city will work collaboratively with community organizations, residents, businesses and other partners to continue, initiate, and expand roadmap actions. When practical, the city will define tactical work plans to drive action implementation. In other cases, implementation strategies will be less formal and more dynamic, adapting to changing conditions and emerging opportunities and priorities.

As implementation accelerates, the city will reinforce its climate action guiding principles of prioritizing equity, improving human health and wellness, and growing a climate economy. This means that the city must engage with diverse community groups and sectors to grow community buy-in and support.

IMMEDIATE PRIORITIES

All of the opportunities and actions in this roadmap are important to support Boise’s climate action goals. Some of the opportunities offer significant potential to help Boise achieve its carbon neutral goal. Some do not offer emissions reduction benefits but will position Boise to adapt to the changing climate.

Recognizing that time and resources are limited, and not everything can or must begin at once, it is necessary to identify immediate priorities for implementation. The following sections identify priorities for the City of Boise to begin implementing as quickly as possible. Some leverage existing efforts (denoted with an arrow), and others are new activities to initiate.

The prioritization process to determine the immediate priorities for reducing emissions for each opportunity included: (1) a quantitative assessment of the emissions reduction potential (as a percentage of total emissions reduction needed to be carbon neutral); and (2) a qualitative assessment of potential climate economy benefits. Potential climate economy benefits include business retention and expansion, business and industry attraction, and workforce and skill development. It also includes general economic health benefits such as a positive return on investment (ROI), operating cost savings for homes and businesses, expanded access to capital and financial incentives, and new community investment opportunities.

The prioritization process to determine the immediate priorities for enhancing resiliency for each opportunity included a qualitative assessment of potential climate resilience benefits and potential climate economy benefits. Potential climate resilience benefits explored the impact of each opportunity on Boise’s ability to be resilient to a range of anticipated climate-related impacts and hazards, including heat stress, drought, heavy precipitation, fires, low river flows, and high streamflow events. Potential climate economy benefits were assessed in the same manner as noted above.

REDUCING EMISSIONS







To be carbon neutral by 2050, all emissions reduction opportunities will need to be implemented. Some will be highly visible in the community (e.g., solar panels, transportation options) while others may occur beyond community boundaries (e.g., utility-scale renewable energy). Some of these opportunities will require upfront capital costs but may result in lower utility bills (resulting in a positive ROI). Other emissions reduction opportunities will present a cost premium (e.g., offsets) but are a necessary investment to become carbon neutral. Some of these opportunities offer quick emissions reduction potential (e.g., building efficiency, electric vehicles) and others are necessary to begin now, to maximize long-term potential (e.g., new technologies, climate advocacy).

REDUCE EMISSIONS	IMMEDIATE PRIORITIES
23. Carbon Offsets & New Technologies	<ul style="list-style-type: none"> ➡ Advance feasibility, funding and implementation planning for Climate Economy Accelerator/Incubator. ➡ Integrate near-term climate action priorities into the annual city budget development process.
22. Climate Advocacy	<ul style="list-style-type: none"> • Establish an annual legislative policy agenda that advances city government climate priorities and positions. • Work with Idaho Power for Public Utilities Commission (PUC) approval to retain all renewable energy credits (RECs) associated with its resource mix.
8. Electric & Efficient Vehicles & Equipment	<ul style="list-style-type: none"> ➡ Continue investment in regional partnerships (e.g., TVCCC) to electrify private fleets. ➡ Develop a city government fleet replacement plan to convert vehicles and equipment.
2. Clean Heat	<ul style="list-style-type: none"> ➡ Develop a thermal energy implementation plan. ➡ Develop a process to electrify city government buildings with major retrofits or repair and maintenance of space and hot water heating equipment.
1. Building Efficiency	<ul style="list-style-type: none"> ➡ Develop a detailed climate action and efficiency strategy for city government operations. ➡ Identify underutilized utility energy efficiency programs and barriers to participation, and bolster with localized outreach and implementation campaigns.

➡ Denotes existing actions that are already underway.

ENHANCING RESILIENCE

To support widespread community resilience, all opportunities in this roadmap will need to be implemented. As with the opportunities to reduce emissions, the opportunities to enhance resilience include a mix of near-term improvement projects and programs, as well as initiating partnerships and planning efforts to catalyze longer-term progress and benefits.

ENHANCE RESILIENCE	IMMEDIATE PRIORITIES
18. Water Supply & Resilience	<ul style="list-style-type: none">  Increase education about water supply, demand and renewed water opportunities. <ul style="list-style-type: none"> • Develop a regional water resources planning group to explore partnerships to develop collaborative policies and water use practices (e.g., policy and planning discussions with local water providers to partner on a regional recharge program combining each partners' unique water supply and infrastructure assets for mutual benefit).
15. Healthy Ecosystems	<ul style="list-style-type: none">  Proactively create, protect and restore native vegetation communities and species habitat to provide ecosystem services on city government properties (including parks, open spaces, and other public properties). <ul style="list-style-type: none"> • Complete mapping of high populations of invasive species and develop restoration plans for climate adapted landscapes.
17. Water Conservation	<ul style="list-style-type: none">  Update development regulations to promote water-conserving landscaping that will absorb rainfall, sequester carbon and reduce the urban heat island effect. <ul style="list-style-type: none"> • Increase education about water conservation opportunities.
13. Agriculture & Environmental Health	<ul style="list-style-type: none">  Continue to improve food production and agricultural practices on properties owned or managed by the City of Boise such as Spaulding Ranch, Twenty-Mile South Farm and other city properties.
5. Distributed Renewable Energy	<ul style="list-style-type: none">  Develop metrics and tracking, to increase solar installation levels to 3.5 MW/yr, tied to historical and forecasted adoption rates for different types/sizes of residential, commercial and community-scale installations. <ul style="list-style-type: none"> • Build on the success of the SolSmart program to identify and eliminate additional barriers to on-site energy storage adoption. Create a permitting and interconnection process guide to encourage residents and businesses to become early adopters of energy storage technology.
20. Resilient Development & Infrastructure Design	<ul style="list-style-type: none">  Maintain an inventory and condition assessment of critical city government facilities, community centers and critical infrastructure. <ul style="list-style-type: none"> • Develop an education and awareness campaign for contractors and designers to advance the resilience conversation throughout building and energy sectors.

 Denotes existing actions that are already underway.

EMISSIONS REDUCTION TARGETS

To accelerate implementation and drive progress, the roadmap defines interim targets. The city will periodically review progress toward these targets, as well as the targets themselves, to make sure Boise is progressing toward its climate commitments. All of the roadmap targets are detailed in Appendix A. Because of the quantitative nature of the GHG emissions reduction goals, the following timeline will help Boise monitor progress toward becoming carbon neutral.

- Install 3.5 megawatts of rooftop solar each year (Distributed Renewable Energy)
- Install a 500-kilowatt community solar garden every five years (Distributed Renewable Energy)
- Reduce per capita vehicle miles traveled by one percent annually (Vehicle Trip Reduction)
- Expand the geothermal system by five million gallons per year until actual production volumes reach 355 million gallons, then apply for additional water rights to continue system expansion (Geothermal Energy)

Eliminate one single-occupant vehicle trip per day per household by 2025 (by not taking the trip or switching to another transportation mode, including carpooling)

2025

2030

IMMEDIATE
& ONGOING

- Achieve 100 percent clean electricity for city government facilities and operations (Utility Scale Clean Electricity)
- Increase participation in energy efficiency programs so energy efficiency savings match annual energy use increase estimates (Building Efficiency)

- Convert all new and existing buildings to high efficiency fossil fuel free heating systems (Clean Heat)
- Transition to 100 percent electric light-duty vehicles (Electric & Efficient Vehicles & Equipment)
- Transition to 100 percent zero emission medium- and heavy-duty vehicles and equipment (Electric & Efficient Vehicles & Equipment)

- Achieve 100 percent clean electricity community-wide (Utility Scale Clean Electricity)
- Carbon Neutral (city government)

2035

2045

2050

Confirm Idaho Power achieves its goal of 100 percent clean electricity (Utility Scale Clean Electricity)

LEAD BY EXAMPLE

While this is the Boise's first Climate Action roadmap, the City of Boise has a long legacy of advancing climate action solutions through policymaking, capital project investments and budgeting decisions.

This roadmap encourages the city to act even more boldly and swiftly in its climate action leadership so all community members can recognize and build on this momentum. It challenges the city to leverage climate action as a catalyst to achieve Boise's strategic priorities.

The city will continue to lead by example, by prioritizing and advancing climate-supporting actions in city government staffing, operations and facilities. It will work to enhance resilience and continuity of operations for city services and functions. It will pursue opportunities to demonstrate its commitment to advancing equity, improving health and wellness, and growing a climate economy.

As a near-term implementation priority to exemplify this commitment to leading by example, the city will develop a roadmap for carbon neutral city government operations and facilities.

Importantly, city government recognizes that it alone cannot drive Boise to achieving the community's climate goals. Instead, city government must be willing to serve in different roles, such as a convener or a partner at the table, to effectively advance climate action community-wide. Furthermore, the city must authentically engage community members to inform decision-making and support implementation.

EXPAND COMMUNITY ACTION

Reaching Boise's climate goals will require widespread community mobilization and engagement. Examples of how community members can participate are showcased throughout this roadmap. These examples recognize and build upon current climate action efforts by individuals, businesses and institutions throughout Boise. They provide a snapshot of common activities but do not represent the full range of possible ways community members can support Boise's Climate Action Roadmap.

Opportunity 21. Community Engagement & Education identifies specific actions to expand community action and engagement. As the community progresses on its climate action journey, the city will continually pursue new ideas and opportunities to engage, inform, and empower community members in all facets of climate action.

TRACK & SHARE PROGRESS

For more than 20 years, the city has developed GHG emissions inventories for city government facilities and operations, as well as community-wide emissions. This roadmap will continue and expand the legacy of transparency and reporting. Starting in 2018, the city committed to annual updates to the city government and community GHG emissions inventory. This annual monitoring will help show progress toward achieving overall emissions reduction goals. The city will also analyze progress on the other roadmap targets and will periodically report out on target and implementation status, including completed, initiated, or refined targets and actions, as well as notable achievements, lessons learned and community stories.





GLOSSARY

TERM	DEFINITION
Adaptation	Anticipating the adverse effects of climate change and taking action to prevent or minimize damage or maximize opportunities.
Advocacy	Activities that aim to influence public policy decisions.
Beneficial electrification	Replacing direct fossil fuel use (e.g., natural gas, propane, etc.) with electricity in a way that reduces overall emissions and energy costs.
Carbon neutral	Achieving net zero carbon dioxide emissions.
Carbon offset	A certificate representing the reduction of one metric ton of carbon dioxide emissions.
Circular economy	An economic system aimed at eliminating waste and the continual use of resources.
Clean electricity	Electrical power produced by methods that do not cause pollution, including photovoltaic solar, geothermal, wind, hydroelectric, and waste heat recovery technologies.
Clean energy	Existing large-scale hydro-electric facilities. In the future, this interpretation could be modified based on advances in energy technology, regulatory changes or other relevant reasons.
Clean heat	Another name for beneficial electrification, with an emphasis on clean energy replacing direct fossil fuel use for heating purposes.
Climate action	Activities to reduce greenhouse gas emissions and strengthen resilience and adaptation to climate-included impacts.
Climate change	A change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcings, or to persistent anthropogenic changes in the composition of the atmosphere or in land use (IPCC, 2012).
Climate migration	The movement of a person or groups of persons who, predominantly for reasons of sudden or progressive change in the environment due to climate change, are obliged to leave their habitual place of residence, or choose to do so, either temporarily or permanently, within a state or across an international border.
Climate justice	The fair treatment of all people and the freedom from discrimination in the creation of policies and projects that address climate change as well as the systems that create climate change and perpetuate discrimination.
Community solar	A medium-sized solar array (e.g. 500 kW) that can provide electricity for a small group of homes or businesses. Members of the community can subscribe to community solar to offset a portion of or all their electricity bill.
Demand side management (DSM) program	Modification of consumer demand for energy through various methods, including education and financial incentives. DSM aims to encourage consumers to decrease energy consumption, especially during peak hours or to shift time of energy use to off-peak periods, such as nighttime and weekend.

TERM	DEFINITION
Distributed renewable energy	Electricity that is generated from sources (often renewable energy sources), near the point of use, instead of centralized generation sources from power plants.
Eco-district	A neighborhood-scale development focused on advancing sustainability through green building, smart infrastructure, and behavior.
Electric vehicle (EV)	A vehicle that uses an electric engine for all or part of its propulsion.
Energy cost burden	Percentage of gross household income spent on energy costs.
Environmental justice	The fair treatment and meaningful of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.
Equity	The state, quality or ideal of being just, impartial and fair.
First/last mile	The beginning or end of an individual trip, most commonly by public transportation.
Food desert	An area that has limited access to affordable and nutritious food.
Food insecurity	Lack of access, at times, to enough food for an active, healthy life for all household members and limited or uncertain availability of nutritionally adequate foods. Food-insecure households are not necessarily food insecure all the time. Food insecurity may reflect a household's need to make trade-offs between important basic needs, such as housing or medical bills, and purchasing nutritionally adequate foods.
Food security	Having reliable access to affordable nutritious food.
Food swamp	Area with a high-density of establishments selling junk food. Note that mapping does not currently exist for food swamp areas in Boise.
Frontline communities	Communities that experience the first and worst consequences of climate change.
Geothermal energy	An energy source that comes from heat stored inside the earth's core and is considered renewable. Energy is provided to residential and business customers in the form of hot water pumped directly from the ground. It is used primarily for heating buildings.
Greywater	Wastewater generated in homes and businesses that does not contain fecal contamination.
Greenhouse gases (GHG)	Gases in the atmosphere that absorb and emit radiation and significantly contribute to climate change. The primary greenhouse gases in the earth's atmosphere are water vapor, carbon dioxide, methane, nitrous oxide, and ozone.
Green Building Code	A roadmap for builders and developers interested in incorporating sustainable, energy efficient components into their buildings beyond the minimum requirements of the current code.
Green power rate	An alternative to traditional electricity rates in which a utility provides interested parties with renewable energy at a contracted unit cost over time.
Green stormwater infrastructure	A system designed to mimic nature and capture rainwater where it falls, reducing and treating stormwater at its source while also providing other community benefits.

TERM	DEFINITION
Heat pump	An energy-efficient alternative to furnaces and air conditioners that collects heat from the outside air, water, or ground and concentrates it for use inside.
Heavy-duty vehicle	Commercial vehicles over a minimum Gross Vehicle Weight Rating (GVRW) of 8,500 lbs.
Hybrid electric vehicle (HEV)	Contains both an electric motor and a gasoline engine. The gasoline engine powers a generator that charges the electric motor. No external battery charger is used. Runs at a constant speed, which increases fuel efficiency
International Green Construction Code (IGCC)	A code that regulates construction of new and existing commercial buildings to meet sustainable, resilience, and high-performance standards.
Integrated Resource Plan (IRP)	The required planning process that utilities undergo to estimate their future loads and determine what sources will be used to meet those loads.
Internal combustion engine (ICE)	A heat engine in which the combustion of fuel occurs with an oxidizer in a combustion chamber that is an integral part of the working fluid flow circuit.
International Panel on Climate Change (IPCC)	The United Nations body for assessing the science related to climate change.
Kilowatt (kW)	A measure of 1,000 watts of electrical power.
Kilowatt hour (KWh)	A unit of electricity consumption.
Leadership in Energy and Environmental Design (LEED)	A green building certification program.
Light-duty vehicle	Passenger cars with a maximum Gross Vehicle Weight Rating (GVRW) of 8,500 lbs.
Low impact development (LID)	Systems and practices that use or mimic natural processes that result in the infiltration, evapotranspiration or use of stormwater in order to protect water quality and associated aquatic habitat
Megawatt (MW)	A unit of electric power equal to 1 million watts.
Metric tons of carbon dioxide equivalent (MTCO_{2e}):	A unit of measure for greenhouse gas emissions. The unit "CO _{2e} " represents an amount of a greenhouse gas whose atmospheric impact has been standardized to that of one-unit mass of carbon dioxide (CO ₂), based on the global warming potential (GWP) of the gas.
Microgrid	A local energy grid with control capability, which means it can disconnect from the traditional grid and operate autonomously.
Micro-mobility	Transportation using lightweight vehicles such as bicycles or scooters, especially electric ones that may be borrowed as part of a self-service rental program in which people rent vehicles for short-term use.
Mitigation	<i>(of climate change)</i> A human intervention to reduce the sources or enhance the sinks of greenhouse gases (IPCC, 2012). <i>(of disaster risk and disaster)</i> The lessening of the potential adverse impacts of physical hazards (including those that are human-induced) through actions that reduce hazard, exposure, and vulnerability (IPCC, 2012).

TERM	DEFINITION
Net-zero emissions	Removal of all human-caused GHG emissions from the atmosphere through reduction and removal measures.
Net zero energy building	A building where the total amount of energy used by the building is equal to the amount of renewable energy generated on the site.
Parallel communities	Community groups (i.e., refugee, immigrant, Mexican, etc.) that exist in a silo within a larger community.
Plug-in hybrid electric vehicle (PHEV)	A vehicle with a combination of both an electric motor and gasoline engine. The battery is charged through a plug and the fuel tank is filled with gasoline.
Resilience	The capacity of social, economic and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity and structure while also maintaining the capacity for adaptation, learning and transformation (IPCC, 2018).
Renewable energy	Energy generated from fuel sources that naturally regenerate over a short period of time. Examples of these fuel sources include sunlight, wind, moving water, biomass, and geothermal. New and existing energy sources that are generally non-reliant on fossil or carbon-based fuels including solar, wind, geothermal and new small-scale hydro-electric facilities. This list is not exhaustive and other renewable energy technologies or practices may be considered on a case by case basis. In the future, this interpretation could be modified based on advances in energy technology, regulatory changes or other relevant reasons.
Renewable energy credit (REC)	Non-tangible property rights of electricity generated by renewable sources – the clean energy attributes, where 1 megawatt-hour of electricity is equal to 1 REC.
Renewable natural gas (RNG)	An alternative to conventional natural gas that comes from sources such as wastewater treatment and agricultural or municipal waste streams. The gas that is generated from these processes can be upgraded for use in conventional natural gas equipment. These sources are considered renewable because the process of burning renewable natural gas is carbon neutral.
Societal cost of carbon	A measure of the economic harm from the impacts from emitting carbon dioxide in the atmosphere.
Solar photovoltaic (PV)	Solar cells/panels that convert sunlight into electricity (convert light, or photons, into electricity, or voltage).
SolSmart	A national designation program recognizing cities, counties, and regional organizations that foster the development of mature local solar markets.
Thermal energy	Energy that is used to heat, such as space heating, water heating, and cooking for homes and businesses as well as process loads for industrial facilities. Natural gas and geothermal energy use generally fall into this category.
Underserved communities	Community members/groups who face systemic inequities and barriers to resources/information.
Utility-scale renewable electricity	Very large renewable electricity installations (e.g. greater than 1 MW) that are implemented by the utility and feed directly into the utility's electric grid. These installation projects do not require a utility customer to opt-in to receive electricity from these sources.
Water renewal	The cleaning of used water (e.g., water that goes down the drain, toilet, etc.).

TERM	DEFINITION
Vehicle miles traveled (VMT)	A measure of the amount of travel for all vehicles in a geographic region, over a given period (typically one year). It is the sum of all miles traveled by all vehicles.
Vulnerable populations	Community members/groups whose condition (i.e. age, housing situation) expose them to greater risks.
Zero emission vehicles (ZEV)	A vehicle that never emits exhaust gas from the onboard source of power.
Zero emissions standard	A requirement for buildings to be designed and equipped so that all energy use on an annual basis is highly efficient and comes only from clean energy sources.



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APPENDIX A: CLIMATE OPPORTUNITY TARGETS



BUILDINGS & ENERGY

- Increase participation in energy efficiency programs so energy efficiency savings to match annual energy use growth estimates by 2030.
- Convert all new and existing residential, commercial and institutional buildings to high efficiency fossil fuel free heating systems by 2050.
- Expand the geothermal system by five million gallons per year until actual production volumes reach 355 million gallons, then apply for additional water rights to continue system expansion.
- Achieve the clean electricity transition goals identified in Boise’s Energy Future:
 - City Government Goal: 100 percent clean electricity by 2030.
 - Community Goal: 100 percent clean electricity by 2035 while prioritizing affordability and access for all.
- Install 3.5 megawatts (MW) of rooftop solar each year.
- Install a 500-kilowatt (kw) community solar array every 5 years.



TRANSPORTATION

- Reduce per capita vehicle miles traveled by one percent annually.
- By 2025, eliminate one driving-alone trip per day per household.
- Transition to 100 percent electric light-duty vehicles by 2050.
- Transition to 100 percent zero emission medium- and heavy-duty vehicles and equipment by 2050.
- Encourage adoption of alternative fuel aircraft and fuel-saving practices at the Boise Airport.



CONSUMPTION & WASTE

- Enhance and expand waste reduction, reuse, and diversion programs for the residential and commercial sectors to decrease the percentage of waste sent to the landfill.
- Maintain at least 40 percent residential waste diversion annually and improve overall landfill diversion rate. Update targets to incorporate strategic planning outcomes.



FOOD SYSTEMS

- Improve food security and grow the food economy by eliminating food deserts and increasing access to affordable and healthy food options.
- Leverage city resources to increase knowledge, understanding and use of regenerative agriculture practices.



NATURAL ENVIRONMENT

- Plant 100,000 trees across the city by 2030.
- Plant 235,000 saplings in nearby forests by 2030.
- Increase restoration efforts in riparian areas and open space reserves.
- Increase opportunities for parks and open space connectivity while balancing protection of native habitat and species.



WATER

- Calculate current per capita daily water use and set a water reduction goal for Boise city residents and city-owned facilities.
- Preserve groundwater for drought conditions.
- Secure additional surface and groundwater storage.
- Provide active aquifer management with aquifer recharge.
- Invest in additional recycled water programs.
- Implement water quality, stormwater management and flood control programs to protect water resources, reduce impacts to property and achieve compliance with regulatory requirements and other intended outcomes.



INNOVATION & ENGAGEMENT

- All future public infrastructure projects establish climate resilience as a primary design objective.
- Raise the overall climate action knowledge and engagement level in the community.
- Advocate for local, state and federal actions that will reduce GHG emissions in Boise.
- Invest in new technologies and purchase carbon offsets as necessary to address GHG emissions that are not technically or economically feasible to mitigate.



