



climate **action** plan

SOUTH BURLINGTON

Prepared by:

Chittenden County Regional Planning Commission

for:

South Burlington's Climate Action Plan Task Force

Adopted by South Burlington City Council October 3, 2022

ACKNOWLEDGEMENTS

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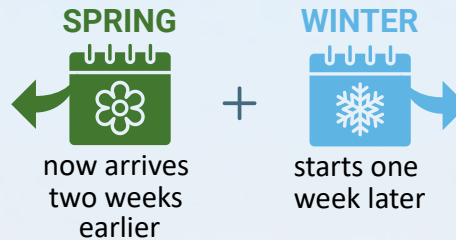
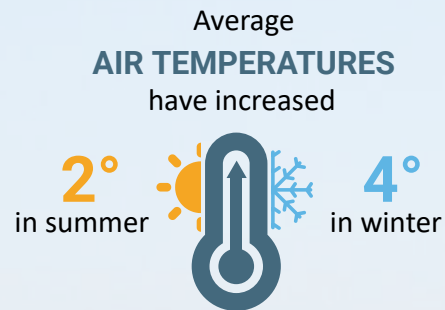
Thank you to the hundreds of community members who provided input!

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Introduction

South Burlington's Climate Has Changed.*



**ANNUAL
PRECIPITATION**
in Vermont has
increased by almost
7 inches

*Days with more than 1 inch of rain
occur almost twice as often as they
did 50 years ago.*

*Source: Vermont Department of Health website



The Intergovernmental Panel on Climate Change (IPCC) [report](#) and other summaries of climate change impacts warn that without immediate concerted action coral reefs will disappear, coastal cities will flood, drought will deplete the breadbaskets that today feed the world and ecosystems will fail.



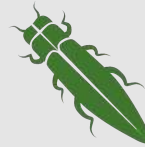
“Climate change is a threat to human well-being and planetary health. Any further delay in concerted anticipatory global action on adaptation and mitigation will miss a brief and rapidly closing window of opportunity to secure a livable and sustainable future for all.”

- Co-Chair Intergovernmental Panel on Climate Change (IPCC) Working Group II

In Vermont:



92 bird species of Vermont, including the common loon and hermit thrush, are expected to disappear from the landscape within the next 25 years.



Climate change exacerbates the threats that invasive plants, insects, and diseases already pose to the health of Vermont's forests.



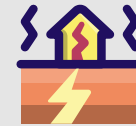
Climate change will have a negative impact on fruit-bearing species like apple trees that require a sufficient over-wintering period for success in the next growing season. The maple syrup industry is also at risk due to variations in winter temperatures.



In 2017, Vermont had the highest rate of reported confirmed and probable Lyme disease cases in the U.S. 1,093 cases of Lyme disease were reported to the Health Department in 2017, the highest annual count ever recorded in Vermont.¹ In the early 1990s, the Health Department received a dozen or fewer confirmed reports of the illness each year.



Flooding is the most likely natural disaster to occur in Vermont; however, extremes will become more common, such as drought. Additionally, more precipitation damages roads and property and increases runoff creating favorable conditions for cyanobacteria blooms which are harmful to human health.



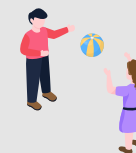
Increases in natural disasters in Vermont will likely increase the risk of injury, illness, and death.



Impacts could affect the quality and safety of food and water, which could lead to increases in food and water-borne illnesses.



Impacts could contribute to mental health challenges.



Children, people over 65 years of age, people of low socioeconomic status, Indigenous people, or people with previous health issues are more vulnerable to the health effects of climate change.

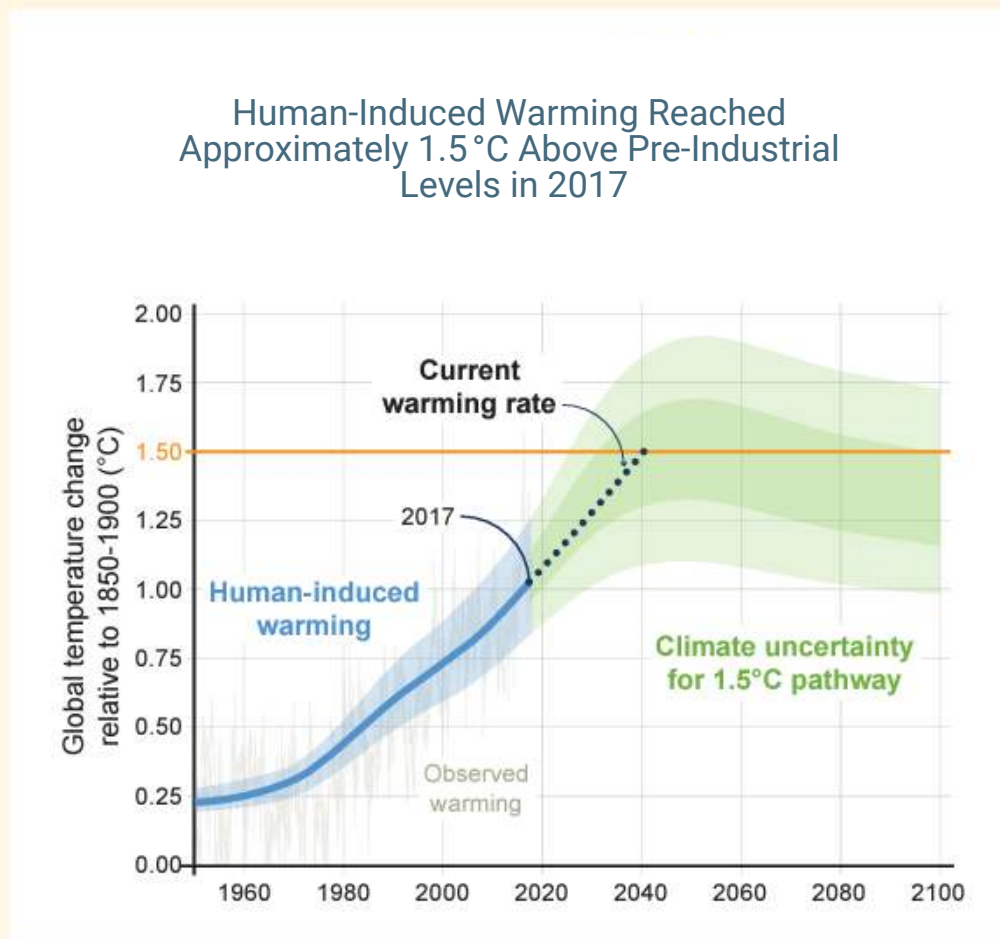
¹ Vermont Health Department, 2017 Report, Vermont Tickborne Disease Program

Acting Now Can Limit Warming to 1.5°C

Global warming is likely to reach 1.5 °C between 2030 and 2052. This rate of warming is likely to increase risks to health, livelihoods, food security, water supply, human security, and economic growth. Extreme heat, floods, and drought will likely result, as well.²

As seen in Figure 1 below, human-induced warming reached approximately 1.5°C above pre-industrial levels in 2017. At the present rate, global temperatures would reach 1.5 °C around 2040.

Figure 1



Source: IPCC, 2018: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. In Press. Page 96

² www.ipcc.ch/sr15/resources/headline-statements

The United States Has Contributed to Climate Change More Than Others

Figure 2

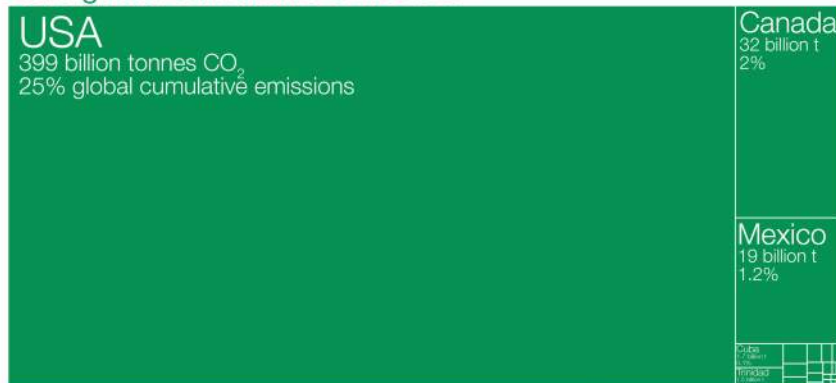
Who has contributed most to global CO₂ emissions?



Cumulative carbon dioxide (CO₂) emissions over the period from 1751 to 2017. Figures are based on production-based emissions which measure CO₂ produced domestically from fossil fuel combustion and cement, and do not correct for emissions embedded in trade (i.e. consumption-based). Emissions from international travel are not included.

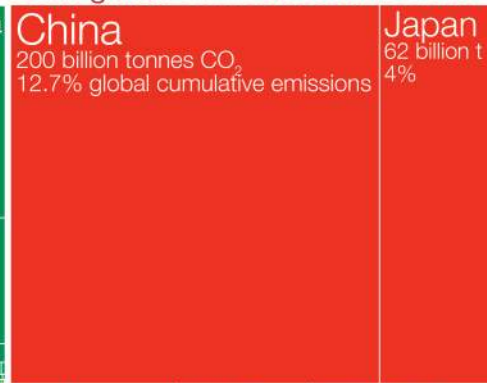
North America

457 billion tonnes CO₂
29% global cumulative emissions



Asia

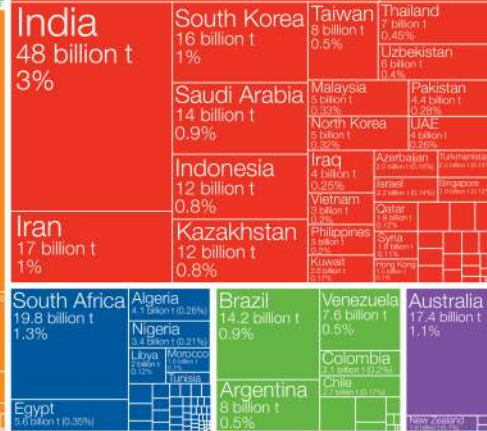
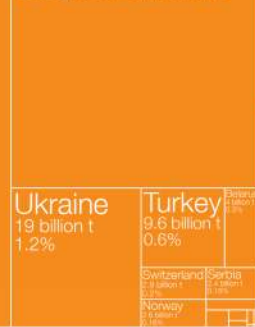
457 billion tonnes CO₂
29% global cumulative emissions



EU-28
353 billion tonnes CO₂
22% global cumulative emissions



Russia
101 billion tonnes
6% global emissions



Europe
514 billion tonnes CO₂
33% global cumulative emissions

Africa 43 billion tonnes CO₂ 3% global emissions
South America 40 billion tonnes CO₂ 3% global emissions

Oceania
20 billion tonnes CO₂
1.2% global emissions

Figures for the 28 countries in the European Union have been grouped as the 'EU-28' since international targets and negotiations are typically set as a collaborative target between EU countries. Values may not sum to 100% due to rounding.

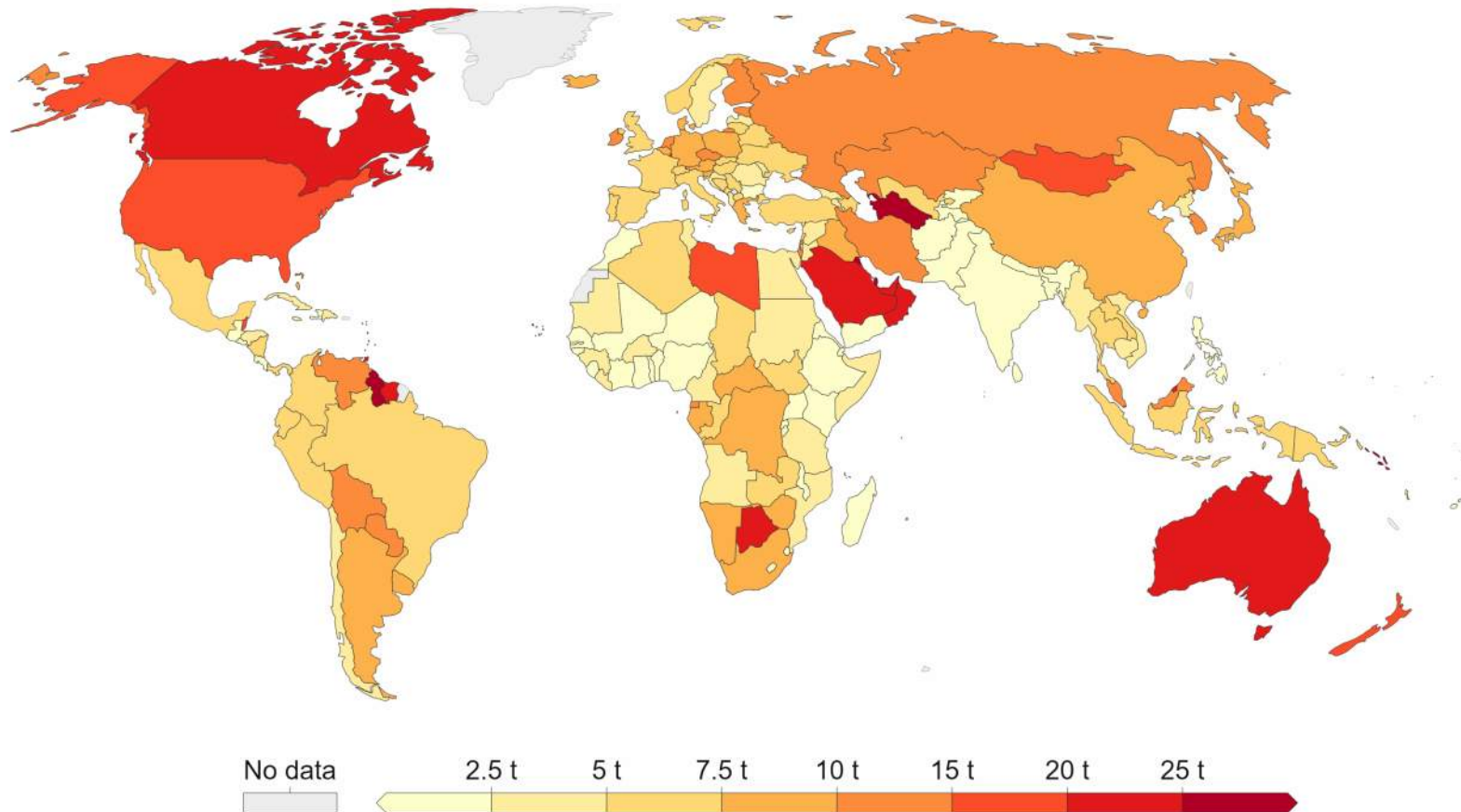
Data source: Calculated by Our World in Data based on data from the Global Carbon Project (GCP) and Carbon Dioxide Analysis Center (CDIAC). This is a visualization from OurWorldInData.org, where you find data and research on how the world is changing.

Licensed under CC-BY by the author Hannah Ritchie.

Figure 3

Per capita greenhouse gas emissions, 2019

Emissions are measured in carbon dioxide equivalents (CO₂eq). This means non-CO₂ gases are weighted by the amount of warming they cause over a 100-year timescale. Emissions from land use change – which can be positive or negative – are taken into account.



Source: CAIT Climate Data Explorer via Climate Watch

OurWorldInData.org/co2-and-other-greenhouse-gas-emissions • CC BY

Note: Greenhouse gases are weighted by their global warming potential value (GWP100). GWP100 measures the relative warming impact of one molecule of a greenhouse gas, relative to carbon dioxide, over 100 years.

To learn more, go to: [Greenhouse Gas Emissions - Our World in Data](#).



Equitably reducing global emissions by 50% requires that high-emitting, wealthy nations reduce their emissions by more than 50%.³ Therefore, **South Burlington's emission reduction goal is to reduce total emissions 60% by 2030 from 2019 levels.**

³ ICELI's Science Based Targets for U.S. Communities

Now Is the Time

South Burlington's climate has changed due to Greenhouse Gas (GHG) emissions. Dependence on fossil fuels is responsible for almost all South Burlington's emissions.

Electricity in Vermont is now markedly cleaner than in the past due to the state's creation of a Renewable Energy Standard (RES) in 2017. Green Mountain Power (GMP) is now 100% carbon free.

Our Leadership Matters

South Burlington has an opportunity to reduce its climate pollution from building heating and transportation by transitioning to carbon-free energy sources, like electricity, and by making it easier to walk or take transit through changes in development and transportation infrastructure. Additionally, nature-based solutions such as protecting and adding trees, maintaining and enhancing natural areas, and installing green infrastructure will increase carbon sequestration and reduce risks from extreme heat and precipitation.

In 2021, South Burlington's Climate Action Plan Task Force (CAPTF) was directed by the City Council to produce a Climate Action Plan for the City of South Burlington. The CAPTF identified high impact actions to significantly reduce South Burlington's share of Vermont's GHG emissions (in line with the Paris International Treaty on Climate Change and Vermont's Global Warming Solutions Act). The Chittenden County Regional Planning Commission was hired as the consultant to provide a GHG inventory and support the drafting of the plan.

The CAPTF recognizes the tension between the natural areas/agricultural actions and the buildings/thermal and transportation/land use actions being considered in this plan. On one extreme, recommending no growth would limit direct emissions, but may cause an increase in transportation emissions from people traveling to South Burlington for work and services. One way that the plan attempts to resolve this tension is by recommending dense development in areas with easy access to walking/biking and services, with conservation of our remaining natural resource areas. Given that transportation emissions are the biggest contributor to climate change, consideration should be given to the actions in this plan which most directly reduce transportation emissions for South Burlington and the surrounding region.

Figure 4

South Burlington 2019 GHG Emissions by Sector

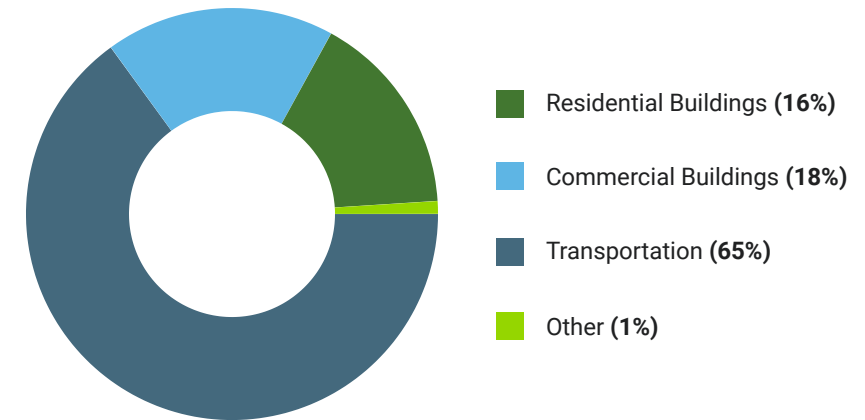
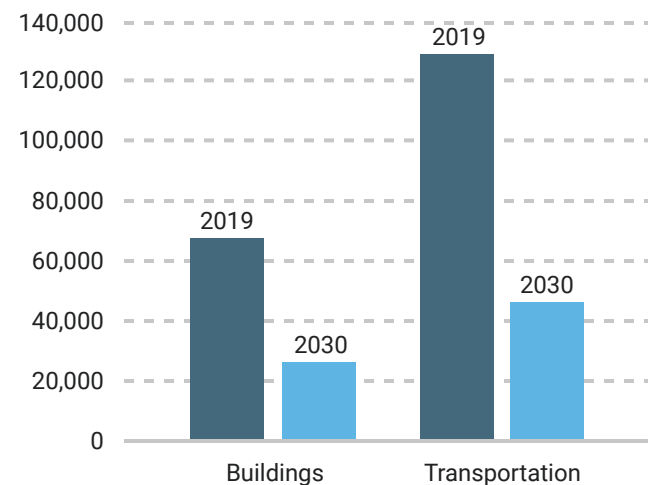


Figure 5

To meet our climate goals, we need to reduce emissions 60% by 2030 and 95% by 2050.

South Burlington
2019 and 2030 Target Emissions, Metric Tons Co2



2030 Targets and Actions

This Climate Action Plan lays out a strategy to meet these climate goals. The strategy is presented in terms of targets, high impact actions, and supporting actions divided among various sectors: buildings/thermal, transportation/land use, city government operations, natural areas/adaptation/resilience, and small engines/waste/agriculture. The high impact actions chosen for meeting the climate goals are informed by modeling with ICLEI's ClearPath Tool. The inclusion of ClearPath modeling creates a data-driven decision-making approach in planning and implementing climate change actions for the City. ClearPath was used to model a baseline inventory of GHG emissions, a business-as-usual forecast, and science-based target (SBT) scenario.

The baseline inventory represents residential, commercial/industrial, and on-road transportation energy consumption along with the associated GHG emissions for the Year 2019 data to avoid capturing pandemic related data fluctuations. The heating of buildings accounts for about 34% of South Burlington's greenhouse gas emissions, on-road transportation accounts for 65%, and 1% of emissions are caused by waste and agriculture. The inventory does not explicitly account for specialized on-site vehicles and motor equipment such as forklifts or ground vehicles in support of airport operations. Further, the inventory does not account for aviation emissions, nor are there targets or actions associated with this source.

In a parallel effort, the Burlington International Airport (BTV), supported by its consultant Vanasse Hangen Brustlin, Inc., is completing a Sustainability Management Plan that will enable the Airport to better understand its existing performance in the areas of energy, water, waste, and greenhouse gas emissions. This Plan will continue to document and report on the sustainability strategies the Airport is currently undertaking (building off its Sustainability Brochure, completed as part of its most recent update to its Master Plan), and develop goals and performance targets. BTV is keenly interested in identifying strategies, particularly high impact, early actions, that it can implement to enable achievement of its sustainability goals and targets.

In support of this assessment, BTV will be developing a greenhouse gas emissions inventory, with a focus on the Airport's scope 1 emissions (direct, Airport-controlled) and scope 2 emissions (indirect, purchased electricity). The Airport's scope 3 emissions (indirect, controlled by others) will also be addressed to the extent data is readily available. The greenhouse gas emissions inventory will be prepared using the Airport Carbon and Emissions Reporting Tool (ACERT).

The business-as-usual scenario represents no climate action taken and creates a projection of emission trends based on anticipated demographic and economic changes in South Burlington. The SBT scenario combines the business-as-usual forecast with the emission reduction goal of a 60% reduction in emissions from 2019 and various actions for meeting the reduction goal. The SBT scenario enabled the CAPTF to understand the degree of implementation of actions needed to electrify buildings and vehicles, weatherize buildings, and reduce vehicle miles traveled to reduce emissions. Table 1 lists the targets that need to be achieved to reduce emissions. The necessary actions for achieving these targets are listed in subsequent sections on each sector.

It is evident that the actions and targets needed to achieve a reduction in GHG emissions by 2030 are ambitious. Therefore, it will take the commitment of City government, residents, and businesses to see themselves as part of the solution to make the necessary changes in travel behavior, heating, energy generation, and land use to reduce fossil fuel energy use and become more resilient to a changing climate. New, efficient heat pump technology, advancements in electric vehicles and small engines, and financial incentives/support make this transition more economical than ever. However, creativity and flexibility will be needed to ensure that those burdened by the cost of the energy transformation are not further exacerbated. Efforts should be made so that impacted communities are considered in the implementation phases of climate action planning that will come subsequent to this plan being finalized.

This Plan acknowledges this parallel effort and supports actions to account for and reduce the Airport's carbon footprint.

Table 1

2030 Buildings and Thermal Targets



Weatherize:

600 existing homes annually to reduce emissions **5%**

Electrify:

8% of existing commercial/industrial square footage annually to reduce emissions by **17%**



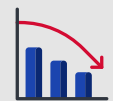
360 existing housing units annually to reduce emissions by **9%**

New homes and businesses to be carbon free to reduce emissions by **4%**

2030 Transportation/Land Use Targets



Replace **75%** of gas vehicles with all electric vehicles (EVs) and plug-in hybrid vehicles to reduce emissions by **42%**



Reduce vehicle miles traveled by **2.5%** annually to reduce emissions by **19%**



Plan for compact high-density (greater than 12.5 dwelling units per acre) new housing development to reduce emissions by **4%**

Equity in Addressing Climate Change

Climate change policies burden renters, people living in multi-unit housing, lower income and fixed income households, Black, Indigenous, and people of color, and senior citizens. The risk of inequity arising due to unforeseen burdens, as well as the opportunity for positive benefits or co-benefits from a target policy are key components of equity considerations. As South Burlington climate action plan policies are considered and implemented, it is important to ask the questions below to empower more inclusive decision-making:



Who is helped?



Who is harmed?



Who is missing?

Things to consider from the State of Vermont Climate Council's Guiding Principles for a Just Transition:



All recommendations directly identify and support relevant impacted and frontline communities.



Future climate goals must be broad for the well-being of all Vermonters and include targeted strategies for different groups that take into account their specific histories, sociocultural and economic realities.



Investments, policies, administration, and oversight tackle the needs of impacted people first, providing the greatest benefits of transitions to these communities.



Where plans and policies create burdens, these burdens are shifted away from impacted communities.

According to the State of Vermont Climate Council's Guiding Principles for a Just Transition, "Studies continue to show that low-income communities, Indigenous peoples, and Black and other communities of color are among those who are particularly vulnerable to the impacts of climate change." Impacted populations also include older, and chronically ill Vermonters. People with disabilities are particularly vulnerable to the impacts of climate change. For more information on building equity into climate change actions and a list of populations vulnerable to the impacts of climate change, see the [State of Vermont Climate Council's Guiding Principles for a Just Transition](#).

Equity Recommendations

To ensure equity considerations and accommodations are made, the CAPTF recommends that the City commit to engage impacted populations in the community on the CAP actions (see impacted populations section for further information). This engagement would include participation from people vulnerable to climate change impacts, community organizations that connect to specific communities and representation from the CAPTF to assess impacts specific to suggested pathways for each sector. Throughout this climate action plan, qualitative equity ranking has been assigned to high priority and supporting actions in each sector. However, impacted populations were not consulted in developing these actions. Because it is critical to ensure that targeted policies, promotions, and investments do not end up harming people who can least afford or adapt to them, and to make sure people are not left out of the positive benefits, the CAPTF recommends that priority funding and policies consider those who are most susceptible to climate change impacts first. Other cities have used this type of engagement to further enhance initial recommendations in the subsequent implementation phases of the plan. This work needs to be adequately resourced to identify an inclusive implementation plan for each sector.



Buildings and Thermal Sector

As policies are being implemented, consider how people with low incomes, disabilities, older Vermonters, and renters may struggle to afford weatherization and electrification and ensure that policies do not increase challenges.



Transportation/Land Use Sector

As policies are being implemented, consider how people with low incomes, disabilities, older Vermonters, and renters may struggle to afford electric vehicles, bikes, or charging equipment and ensure programs and support are equitably available for reducing transportation emissions. Ensure equitable access to housing throughout the City in a manner that encourages walking/biking and transit use.



Renewable Energy Sector

Impacted populations may not be able to participate in renewable energy due to cost or because they live in multi-family housing. Policies should be developed to ensure impacted populations have access to the benefits of renewable energy through community net-metering or other programs.

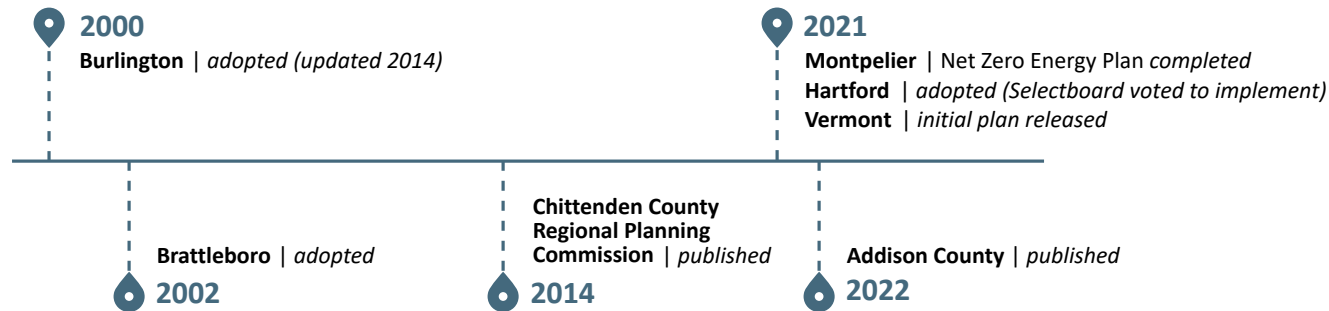


Natural Areas Sector

Considerations of the historical context and current conditions associated with systemic racism and environmental injustices, and how these relate to the natural environment, should be made as policies are implemented. This includes ensuring fair access to natural areas for all to enjoy.

What is a Climate Action Plan?

A climate action plan is a framework for measuring and reducing greenhouse gas (GHG) emissions and related climatic impacts. Climate action plans include an inventory of existing emissions, reduction goals or targets, and prioritized reduction actions. Several governments in Vermont have climate action plans. Click on the links below to view them.







Climate Action by Sector

Actions in a climate action plan are broken out by sector. Transportation and buildings are always the highest emitting sectors and therefore will need aggressive changes for reducing emissions. In the following pages, each sector includes analysis of South Burlington's greenhouse gas emissions in that sector, a 2030 science-based target (SBT) to lower those emissions, and either high impact or supporting actions to achieve this change.




High impact actions are the most effective at reducing emissions at the scale and pace necessary to meet the City's fair share of emissions reductions in accordance with the Paris International Treaty on Climate Change and Vermont's Global Warming Solutions Act. High impact actions are either policy or investment oriented and produce a measurable reduction in GHG emissions. Supporting actions are educational, promotional, and are not always quantifiable. Supporting actions tend to also be critically important for minimizing risks from increased precipitation, heat waves, and other climate change consequences. Below is a high-level overview of the high impact and supporting actions included in this plan. For more detailed information about the actions, see the sections on specific sectors on the following pages.

High Impact Actions

-  Renewable energy
-  Carbon free heating and electrification
-  EV transition
-  Compact development and driving less



Supporting Actions

-  Government operations
-  Natural areas, adaptation and resilience
-  Waste, agriculture, small engines



Buildings and Thermal

34% of Emissions*

The thermal heating of buildings accounts for about 34% of South Burlington's greenhouse gas emissions.



VISION: South Burlington will weatherize and electrify existing buildings, and new construction will be net zero and fossil fuel free by 2030.

2030 Targets



Weatherize:
600 existing homes annually to reduce emissions by 5%

Electrify:
8% of existing commercial/industrial square footage annually to reduce emissions by 17%
360 existing housing units annually to reduce emissions by 9%



New homes and businesses to be carbon free to reduce emissions by 4%

Since 2019



200 heat pumps per year have been installed in South Burlington buildings.



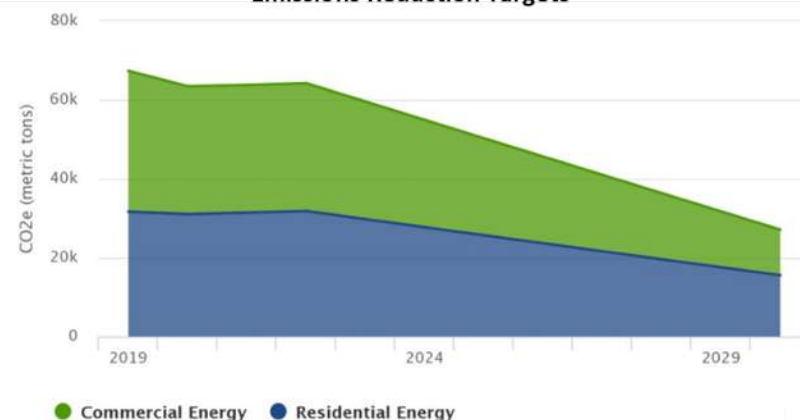
183 homes in total have received weatherization upgrades from VGS, Efficiency VT, Champlain Valley Office of Economic Opportunity, or BTV Noise Mitigation Plan.



Go to vtenergydashboard.com/statistics for current totals and more historical information.

Figure 6

Emissions Reduction Targets



High-Impact Actions**

- Become a 2030 District, a public-private partnership, to encourage commercial buildings to benchmark energy use and set reduction targets.
- Develop an energy efficiency ordinance for high energy use buildings similar to Burlington's Minimum Housing Code Weatherization Ordinance.
- Develop a preferential tax rate for highly efficient buildings that are not using fossil fuel.
- Advocate for a state-wide Clean Heat Standard for heating fuels.
- Prohibit fossil fueled thermal in new buildings.
- Propose charter change to regulate fossil fueled thermal in existing buildings.
- Adopt net zero energy building code for new construction.
- Adopt building code and hire code inspector to ensure energy code compliance.

**See Appendix C for a complete list of High Impact and Supporting Actions categorized by sector, science-based target, action, and measurement metrics.

*As of base year 2019

In 2019, 34% of the South Burlington’s greenhouse gas (GHG) emissions were generated from buildings, the majority from natural gas. Building emissions are primarily generated for space heating, water heating, and cooking.

Electricity from Green Mountain Power is now 100% carbon free. This means that lighting and electric appliances are not contributing to South Burlington’s GHG emissions and reductions can be met via the electrification of thermal processes. VGS also plans to increase renewable natural gas by 20% by 2030.

To reach South Burlington’s emissions reductions goals in buildings by 2030, all newly constructed buildings will need heating from fossil fuel-free energy

sources such as heat pumps.

Policies should also focus on efficiency measures (weatherization), such as insulation, windows, and air sealing to reduce energy use and make electrification more affordable. Some level of weatherization will occur in the City via the FAA sound insulation program.

However, prioritizing electrification, regulating fossil-fuel-based energy use, and decreasing embodied carbon in new construction and existing buildings will have the highest impact on building emissions.

There is a natural sequencing of actions presented in this Plan. Incentives, such as the 2030 District program and a preferential tax rate, precede requirements, but the ordering is subject to change (for

example, funding availability, staff capacity, and political will). The City will need to establish programs, policies, and building codes to achieve outcomes that successfully reach its emissions reduction targets for buildings.

Requirements are needed because some activities—such as continued use of natural gas—will likely prevent the City from reaching its GHG reduction goals. The modeling shows several paths to reaching goals, and not reaching targets in one sector necessitate higher targets in other sectors.

The City may also need to help building owners overcome barriers associated with certain requirements, such as the retrofitting of existing buildings for electrification efforts. Increased demand for

more efficient new buildings and building retrofit projects will require specialized job training to support the transition to low-carbon, resilient buildings.

High impact building actions are outlined below. The full set of buildings and thermal actions is included in Appendix C.

As policies are being developed, consider how people with low incomes, disabilities, and older Vermonters may struggle to afford weatherization and electrification and ensure that policies do not increase challenges. Programs such as CVOEO’s well-funded low income weatherization service now include heat pumps. Efficiency Vermont also has money for income-eligible heat pump assistance.

Buildings and Thermal High Impact Actions

Action	GHG Reduction	Cost	Equity	Type
Become a 2030 District, a public-private partnership, to encourage commercial buildings to benchmark energy use and set reduction targets www.2030districts.org	High	NA	Neutral	Policy
Develop an energy efficiency ordinance for high energy use buildings similar to Burlington's Minimum Housing Code Weatherization Ordinance.	High	\$\$	Consider accommodations in implementation	Policy
Develop preferential tax rate for highly efficient buildings not using fossil fuels.	High	\$	High	Policy
Advocate for a state-wide Clean Heat Standard for heating fuels	High	NA	Neutral	Policy
Prohibit fossil fueled thermal in new buildings	Very High	\$\$	Consider accommodations	Policy
Propose charter change to regulate fossil fueled thermal in existing buildings	Very High	\$\$	Consider accommodations	Policy
Adopt net zero energy building code for new construction	Very High	\$\$	Consider accommodations in implementation	Policy
Adopt building code to and hire code inspector to ensure energy code compliance	High	\$\$	Consider accommodations in implementation	Policy



Transportation / Land Use

65% of Emissions*

Transportation accounts for about 65% of South Burlington's greenhouse gas emissions.



VISION: South Burlington will make policies to increase electric vehicle (EV) adoption and reduce vehicle miles traveled (VMT). South Burlington will promote and encourage biking, walking, transit use, and until EVs are broadly adopted, transportation fuel efficiency.

2030 Targets



Replace **75%** of gas vehicles with all electric vehicles (EVs) and plug-in hybrid vehicles to reduce emissions by **42%**



Reduce vehicle miles traveled by **2.5%** annually to reduce emissions by **19%**



Plan for compact high-density (greater than 12.5 dwelling units per acre) new housing development to reduce emissions by **4%**

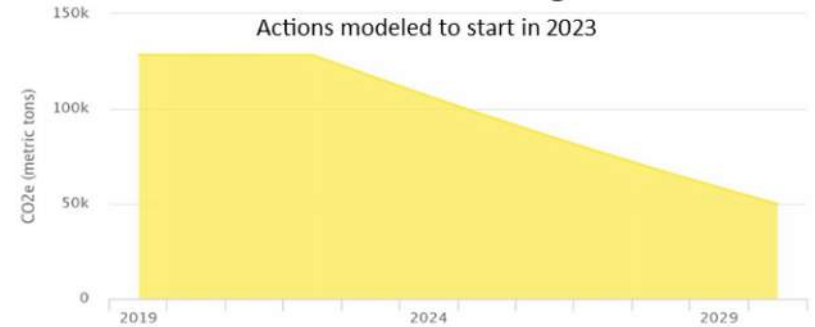
As of 2021



174 all electric vehicles and **166** plug in hybrid vehicles are registered in South Burlington. This is **2%** of all registered vehicles.

Figure 7

Emissions Reduction Targets



High Impact Actions**

Electric Vehicle Adoption

- Adopt a policy to require all new buildings have the appropriate amount of electric vehicle charging equipment and 200-amp electric service.
- Partner with GMP to speed up EV adoption in South Burlington including siting, make-ready infrastructure, fast charging stations, and incentives.

Reduce Vehicle Miles Traveled

- Partner with CATMA to increase membership among employers and increase carpooling, teleworking, and walking/biking/bike sharing.
- Prioritize higher density, mixed use development and affordable housing in areas with existing or planned reliable transit options, services, and infrastructure (including bike/ped) within the transit overlay district.
- Invest in Green Mountain Transit to increase transit ridership on existing route, identify new routes, and increase frequency.
- Establish park & ride/carpool lots to connect with public transportation.
- Create a walk/bike master plan, recommend investments in retrofits of infrastructure, and to make bike/pedestrian infrastructure safer.
- Where feasible and safe, reduce travel lanes to accommodate bike lanes.

**See Appendix C for a complete list of High Impact and Supporting Actions categorized by sector, science-based target, action, and measurement metrics.

*As of base year 2019

In 2019, 65% of the South Burlington’s greenhouse gas (GHG) emissions were generated from transportation.

To meet the City’s GHG reduction goal, 75% of private and public vehicles registered in the City will need to be all electric (EVs) or plug-in hybrids by 2030. Modeling indicates that at least half of vehicles should be all electric and the remainder should be plug-in hybrid EVs. Additionally, transportation emissions will be reduced somewhat due to improvements in Corporate Average Fuel Economy (CAFÉ) standards.

To achieve this goal, the first priority is to ensure that buildings have 200-amp service to support EV charging at home. Additionally, new buildings should have

the appropriate number of electric vehicle charging stations installed at the time of construction.

The City can make an additional impact by developing incentives for commercial buildings to install EV charging. Research shows that most EV charging happens at home or at work.

To achieve the City’s GHG reduction goals, a reduction of vehicle miles traveled (VMT) of 2.5% annually is also necessary. This can only be achieved through strong policy and investment programs developed by the City. This includes some method of increasing teleworking by at least 50%, building homes in a compact dense pattern to encourage smaller homes with lower heating and cooling

needs, increasing biking and walking for local trips, and investing in public transportation to improve routes and frequencies.

However, changes to land use policies, transit services, and bike/pedestrian infrastructure and programs all have a long lead time. Meanwhile, a strong push for vehicle electrification will have the greatest impact.

The City will need to provide programs and resources, such as educational campaigns and financial incentives to businesses to support EV adoption. Accessible EV charging infrastructure is needed to enable widespread EV adoption and should be a priority.

High impact transportation actions are

outlined below. The full set of transportation actions is included in Appendix C.

As policies are being developed, consider how people with low incomes, disabilities, and older Vermonters may struggle with necessary transportation and ensure that policies do not increase challenges. Impacted populations may not be able to afford electric vehicles, bikes, or charging hardware and need access to programs and support for reducing transportation emissions. An example is Vermont’s Multiunit Dwelling EV Charging Grant, which funded electric vehicle charging solutions for residents.

Transportation High Impact Actions

Action	GHG Reduction	Cost	Equity	Type
Adopt a policy to require all new buildings have the appropriate amount of electric vehicle charging equipment and 200-amp electric service	High	NA	High but need to ensure this doesn’t raise the cost of housing	Policy
Partner with GMP to speed up EV adoption in South Burlington including siting, make-ready infrastructure, fast charging stations, and incentives.	High	\$	High	Policy
Partner with CATMA to increase membership among employers and increase carpooling, teleworking, and walking/biking.	High	NA	High	Promotion
Prioritize higher density, mixed use development and affordable housing in areas with existing or planned reliable transit options, services, and infrastructure (including bike/ped) within the transit overlay district.	High	NA	High	Policy
Invest in Green Mountain Transit to increase transit ridership on existing route, identify new routes, and increase frequency.	High	\$\$	High	Investment
Establish park & ride/carpool lots to connect with public transportation	High	\$\$	High	Policy
Develop parking maximums	High	\$	Accommodations for Vulnerable Populations	Policy
Create a walk/bike master plan, recommend investments in retrofits of infrastructure, and to make bike/pedestrian infrastructure safer.	High	\$	Prioritize Areas with Vulnerable Populations	Policy
Where feasible and safe, reduce travel lanes to accommodate bike lanes	High	\$\$	Prioritize Areas with Vulnerable Populations	Policy

Renewable Energy



VISION: South Burlington will increase renewable energy generation in the City to advance the State's goal of sourcing 90% of energy needs from renewable sources.

However, there are currently constraints on new large scale net metering projects in South Burlington. Net metering is currently available for small scale projects, such as rooftop, parking canopies, and backyard solar.

By 2030:

↑ Increase new renewable energy generation to between **30,794** to **55,549** Megawatt Hours (MWh).

By 2050:

↑ Increase new renewable energy generation to between **63,297** to **121,060** Megawatt Hours (MWh).

As of 2022:

Renewable energy generation in the City is **22,544** MWh.



Go to vtenergydashboard.com/statistics for current totals and more historical information.

Renewable Energy Generation Targets*

- ☑ To reach the targets, the City needs to generate a total of **85,841 MWh** (Megawatt Hours) of energy to meet the low
- ☑ State target or **143,604 MWh** to meet the high State target.

Currently, **22,544 MWh** of renewable energy is generated within the City. The City should plan to increase renewable energy generation to between **63,297 to 121,060 MWh** of additional renewable energy by 2050 to advance the State's 90X2050 goal.



South Burlington roof tops and parking lots have the potential to generate **161,979 MWh** of electricity and **109,396 MWh** of electricity, respectively.

Supporting Actions*

- Adopt a policy to require qualifying new buildings to be built with solar or other renewable net metered systems/paired with energy storage to increase resiliency/reliability of electrical system during outages and decrease fossil fuel usage during peak periods.
- Identify existing commercial roofs, parking areas and other areas that do not currently provide carbon sequestration or storage, wildlife habitat, water filtration, etc. where solar arrays would be compatible and should be prioritized.
- Create a program to incentivize residents and businesses to install solar arrays on their roofs, over parking lots, or as appropriate as free-standing structures and or participate in community solar.
- Update the Comprehensive Plan according to the Dept. of Public Service Energy Planning Standards for renewable energy standards (Act 174).
- Develop materials to educate HOAs on right to install rooftop solar on condos as per state statute.
- City to adopt "solar access law" similar to Boulder, Co. to require new PUDs and subdivisions to orient residential units to maximize solar access and be structurally capable of supporting solar collectors. See 9-9-19 (g) »

*Data for renewable energy generation potential on rooftops may be subject to change if the VT Dept of Public Service develops a methodology which aligns with this project schedule. Also these renewable energy generation targets are based on the 2018 ECOS Plan and are subject to change given updates to energy planning standards. The targets are likely to stay the same or decrease because of grid constraints.

Although it will not lower greenhouse gas emissions, the City has renewable energy targets set by the State to help Vermont increase its renewable energy. To meet its targets, renewable energy generation needs to increase by 3 to 5 times the amount of current generation sited in the City.

However, as of the drafting of this climate action plan, Green Mountain Power is currently limiting new large scale net metering projects in South Burlington due to electricity grid capacity constraints. See adjacent map for the area that is constrained and subject to a tariff fee to fund upgrades. Until capacity issues are resolved, net metering is available for small scale projects, such as rooftop and backyard solar.

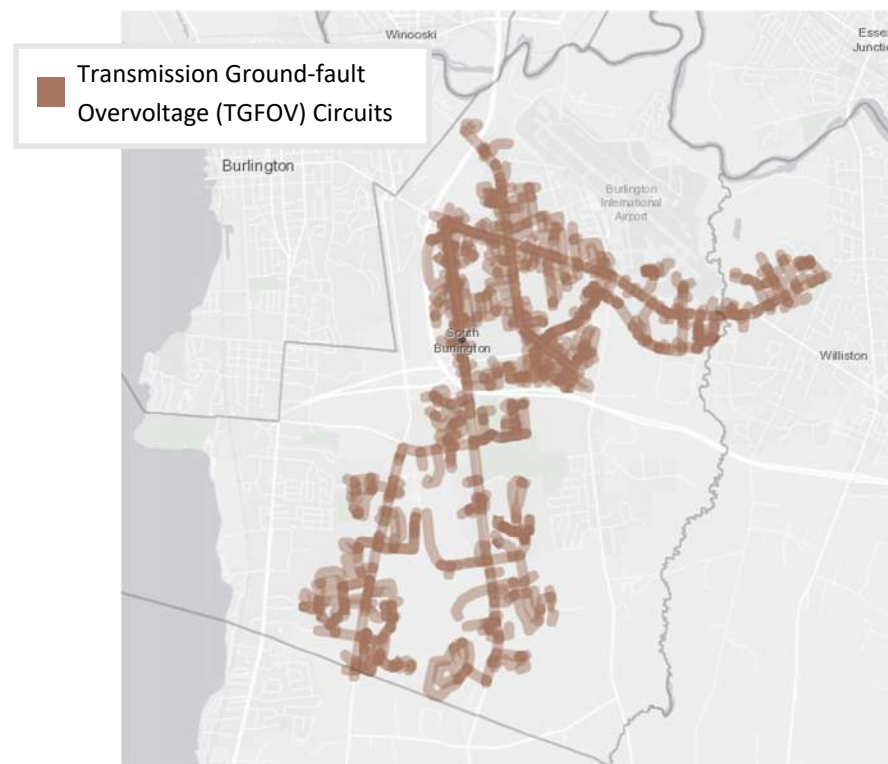
Pairing renewable energy with energy storage (batteries) is a necessary and rap-

idly growing component of cost effective renewable energy integration. Numerous energy storage products and services exist and customers should be able to easily access information about solutions.

Green Mountain Power currently offers a program for the purchase or lease of Tesla Powerwall Batteries or a rebate for other customer-chosen storage options when customers agree to share power with GMP at peak periods.

All renewable energy actions are outlined below.

Impacted populations may not be able to participate in the benefits of renewable energy due to cost or because they live in multi-family housing. Policies should be developed to ensure impacted populations have access to the benefits of renewable energy through community net-metering or other programs.



GMP Solar Map 2.0

Renewable Energy High Impact Actions

Action	Cost	Equity	Type
Adopt a policy to require qualifying new buildings to be built with solar or other renewable net metered systems/paired with energy storage to increase resiliency/reliability of electrical system during outages and decrease fossil fuel usage during peak periods.	\$\$	Consider accommodations for affordable housing	Policy
Identify existing commercial roofs, parking areas and other areas that do not currently provide carbon sequestration or storage, wildlife habitat, water filtration, etc. where solar arrays would be compatible and should be prioritized.	\$\$	NA	Policy
Create a program to incentivize residents and businesses to install solar arrays on their roofs, over parking lots, or as appropriate as free-standing structures and or participate in community solar.	\$\$	Prioritize Areas with Vulnerable Populations	Investment
Update the Comprehensive Plan according to the Dept. of Public Service Energy Planning Standards (Act 174).	\$	NA	Policy
Develop materials to educate HOAs on right to install rooftop solar on condos as per state statute: https://legislature.vermont.gov/statutes/section/24/061/02291a	\$	Equity considerations	Promotion
City to adopt "solar access law" similar to Boulder, Co. to require new PUDs and subdivisions to orient residential units to maximize solar access and be structurally capable of supporting solar collectors. See 9-9-17 (g) at: https://library.municode.com/co/boulder/codes/municipal_code?nodeId=TIT9LAUSCO_CH9DEST_9-9-17SOAC	NA	Policy needs to consider adjustments for higher density development	Policy

Natural Areas, Adaptation, and Resilience



VISION: South Burlington will ensure land is managed for carbon sequestration and to be adaptive and resilient to climate change impacts.

2030 Targets



Reserve remaining natural resource areas



Increase green infrastructure and soil health for carbon sequestration, wildlife and insect habitat, flood resiliency and water filtration



Growing food

Reduce Risks From



Extreme heat



High winds



Drought

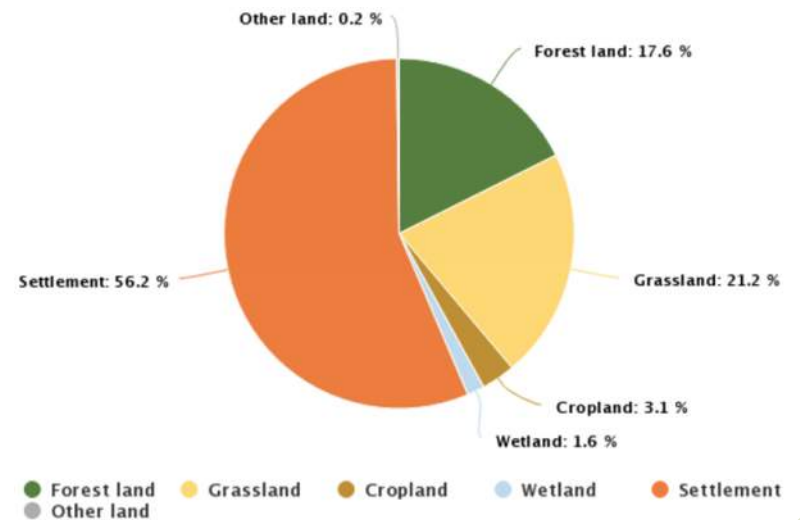


Extreme precipitation



Depleted agricultural soils

Figure 8 Land Cover in South Burlington, 2019



Supporting Actions*

- Revise South Burlington's land development regulations to protect our remaining meadows, forests, grasslands and farmlands from further encroachment, as permitted by law.
- Replace 30% of lawns with native plant species by 2030.
- Retain and Increase Tree Canopy: Develop a program to increase the planting of native trees on private property, and support ongoing implementation.
- Increase open space funds to conserve open space and agricultural lands.
- Increase protection of rivers and streams and wetlands.
- Consider joining [Cities with Nature](#) to collaborate with other urban areas on reconnecting communities with nature.
- Implement green infrastructure principles into the built environment.
- Ensure resilient stormwater infrastructure.
- Expand the City's tree ordinance to include tree maintenance and removals on private property.

*See Appendix C for a complete list of High Impact and Supporting Actions categorized by sector, science-based target, action, and measurement metrics.

The City’s climate change goals cannot be accomplished through greenhouse gas (GHG) emissions reduction alone. The State of Vermont’s Climate Action Plan contemplates a carbon “budget” and so should South Burlington’s plan.

Carbon sequestration captures and stores carbon dioxide from the atmosphere. Carbon sequestration levels must be maintained through the retention and expansion of nature-based systems, especially forests and wetlands due to their carbon sequestration. (See the [State of Vermont Climate Action Plan, 2021 Carbon Budget](#), to see which land sectors provide sequestration of carbon and those that emit carbon.) As of 2019, 17.6% of South Burlington’s land cover was forest land

and 1.6% was wetland. Between 2001 and 2019, the City lost 206 acres of forest land to settlement.

It is important for the City to prioritize retention of forests because any loss of these major carbon sinks will add quantifiable carbon to the atmosphere. Sequestration can be further enhanced by reducing lawn turf and increasing native trees and complementary native plantings. Native plants encourage native animal and insect species to continue to thrive, which increases the health of trees and all living systems.

It will be essential to conduct detailed assessments of existing systems in order to set meaningful and measurable goals for maintaining and increasing

carbon sequestration.

Carbon sequestration is only one important benefit of conserving natural ecosystems. Natural ecosystems improve air and water quality, reduce impacts from the urban heat-island effect, improve stormwater management, enhance flood hazard management, enhance food security, and provide critical areas for bio-diversity in the face of a changing climate.

Resilience to the impacts of climate change including extreme heat and increased precipitation and flooding also requires implementation of green and green-blue infrastructure and sophisticated stormwater practices.

Compared to other strategies, protec-

tive environmental practices have relatively low capital cost to implement and also increase the health, well-being, and prosperity of all living beings in communities.

Natural areas, adaptation, and resilience actions are outlined below. The full set of actions, including supportive actions, is included in Appendix C.

Considerations of the historical context and current conditions associated with systemic racism and environmental injustices, and how these relate to the natural environment, should be made as policies are developed. This includes ensuring fair access to natural areas for all to enjoy.

Natural Areas, Adaptation, and Resilience High Impact Actions

Action	Carbon Exchange	Cost	Equity	Type
Revise South Burlington’s land development regulations to protect our remaining meadows, forests, grasslands and farmlands from further encroachment, as permitted by law.	+++ (forests only)	\$	Needs equity consideration	Policy
Replace 30% of lawns with native plant species by 2030.	+	TBD	Prioritize vulnerable populations	Policy
Increase open space funds to conserve open space and agricultural lands	-	\$	Needs equity consideration	Investment
Retain and Increase Tree Canopy: Develop a program to increase the planting of native trees on private property, and support ongoing implementation.	++	TBD	Prioritize vulnerable populations	Promotion
Increase protection of rivers and streams and wetlands	+	TBD	Prioritize vulnerable populations	Policy
Consider joining Cities with Nature to collaborate with other urban areas on reconnecting communities with nature: citieswithnature.org	NA	NA	High	Education
Implement green infrastructure principles into the built environment	NA	\$	Prioritize vulnerable populations	Policy
Ensure resilient stormwater infrastructure	NA	\$\$	Prioritize vulnerable populations	Policy

City Government Operations



VISION: South Burlington will develop green practices in City operations, electrify City equipment and facilities, and reduce City employee VMT.

2030 Targets



City operations following green practices



City equipment and facilities electrified or substantially more efficient



Track and reduce City employee Vehicle Miles Traveled (VMT)

Figure 9

Percent of Emissions in Public Works Department (Year 2019)

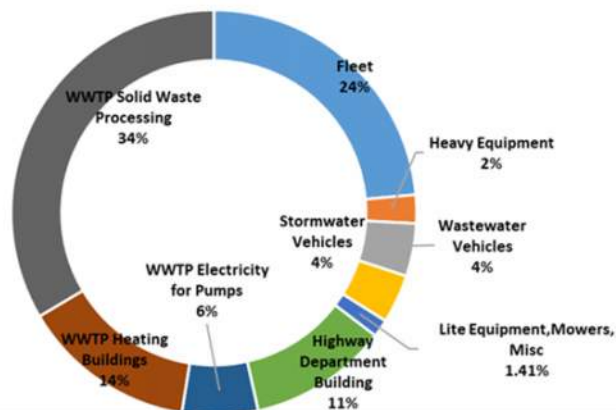
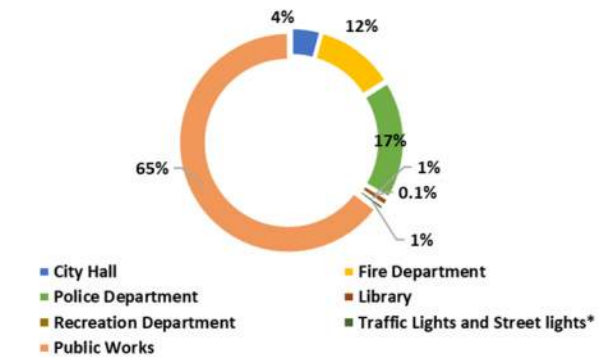


Figure 10

GHG Emissions by City Department (Year 2019)



City government operations contribute 1,431 mt Co2e



Supporting Actions*

- Adopt green operations, purchasing, and investment policies.
- Determine strategy and budget for municipal vehicles and equipment to electrify or become zero emission.
- Budget for annual electric vehicle charging equipment installments at City departments. During renovation or construction, make sites EV-ready.
- Replace gas-powered small engine equipment with electric models.
- Develop a plan to electrify and increase the energy efficiency of all municipal buildings.
- Develop a program to support employee transit, walking and bike, ride sharing, and work-from home and encourage online attendance at all meetings. Consider becoming a member of CATMA.
- Work with the school district to develop a policy for discouraging driving to school (disincentives) and encouraging students to ride the bus, bike, or walk to reduce single occupancy driving to school.

*See Appendix C for a complete list of High Impact and Supporting Actions categorized by sector, science-based target, action, and measurement metrics.

The City as an entity should lead by example in their efforts to decarbonize their operations.

As seen in the pie charts on the previous page, the public works department contributes most of the emissions in the government operations sector. Second to the public works department is the police department. Both of these departments include vehicles that use gasoline and diesel. These fuel types contribute to a majority of the emissions. Therefore it is important for the City to plan for and budget for replacement of these vehicles with zero emission options as the technology becomes available. Additionally, one third of the natural gas used by Public Works is used in the processing high quality solid waste. Any known alternative to this process would increase

the GHG emissions and cost by a factor of at least four.

The proposed actions below suggest benchmarking current energy uses and energy sources and then developing policies and procedures that can be implemented to reach the City's greenhouse gas reductions goals through green practices, renewable energy, and electrification solutions.

The City has already made much progress in this direction. In 2019, the City hired a part time Energy Manager who oversees energy projects and created an Energy Project Reserve Fund to pay for internal projects. The fund's income comes from the solar array on the former landfill in South Burlington and projects pay the fund back via energy savings.

Energy usage has been monitored for

many years, and since 2019, all energy usage has been recorded on a monthly basis in terms of usage and cost.

In an effort to decarbonize its operations, the City began converting all City owned lights to LED, a project that is virtually complete in 2022. This included street and traffic lights as well as lighting for buildings.

Many energy audits of the various buildings have been conducted leading to a variety of energy reduction projects and this process continues.

The electrification of the City vehicle fleet started years ago with a single hybrid car. Four hybrid police vehicles are planned for 2022 and the South Burlington School District will have four electric school buses delivered this year.

The City also purchased small battery powered landscaping equipment such as weed whackers and chain saws.

In 2021 a new City Hall and Library was completed to LEED standard. This new building utilizes a geothermal heat pump and solar panels on the roof.

In addition, the upgrading of the Bartlett Bay Wastewater Treatment Plant, now being designed, will have energy conservation as a major design criteria.

City government operations actions are outlined below. The full set of actions is included in Appendix C. Equity considerations associated with the following actions will occur in the implementation phase.

City Government Operations High Impact Actions

Action	Cost	Equity	Type
City to adopt green operations, purchasing, and investment policies	\$	Provide Education to City Employees	Policy
City to determine strategy and budget for municipal vehicles and equipment to electrify or become zero emission.	NA	Provide Education to City Employees	Investment
City to budget for annual electric vehicle charging equipment installments at City departments. During renovation or construction, make sites EV-ready.	\$	Provide Education to City Employees	Investment
City to replace gas-powered small engine equipment with electric models.	\$	Provide Education to City Employees	Investment
City to develop a plan to electrify and increase the energy efficiency of all municipal buildings.	NA	Provide Education to City Employees	Investment
City to develop a program to support employee transit, walking and bike, ride sharing, and work-from home and encourage online attendance at all meetings. Consider becoming a member of CATMA.	NA	Provide Education to City Employees	Policy
City to work with the school district to develop a policy for discouraging driving to school (disincentives) and encouraging students to ride the bus, bike, or walk to reduce single occupancy driving to school.	NA	Consider Challenges for Vulnerable Populations	Policy

Small Engines, Waste, and Agriculture/Food Systems



VISION: South Burlington will electrify small engine equipment, reduce solid waste, and ensure sustainability of local food and farm systems while decreasing emissions.

2030 Targets



Reduce municipal and construction waste and trash pick-up



All small engines electrified



Increased access to locally grown food

Supporting Actions

Small Engines



Curtail or ban small gas powered equipment and ban leaf blowers.

Waste



As a member of CSWD, reduce municipal and construction waste. Limit trash pickup to only every other week.

Agriculture / Food Systems



Launch a Nature Based Solutions Program that includes food systems, farms, and expanded community gardens. Utilize recommendations from the South Burlington Sustainable Agriculture/Food Security Action Plan.



Work with UVM Extension and non profit programs to promote food education in schools and sustainable agricultural practices that support local farms and reduce reliance on large, out of state food producers and their associated VMT.



Encourage food retailers to carry local products.



Promote "Vitality gardens" as a way to bring healthy seniors and younger people together around the community to grow local produce for home consumption.

The City of South Burlington can lower greenhouse gas emissions by developing policies that reduce municipal and construction waste and policies that limit the number of trash pick-ups in neighborhoods. Both of these restrictions serve to encourage recycling and waste reduction as well as lower carbon emissions and noise pollution.

The City can support further decarbonization through curtailing or banning the use of fossil fueled small engines for lawns and gardens. Gasoline powered leaf blowers and small equipment produce CO2 emissions just like automobiles. Requiring these small engines to run on electricity would greatly reduce the carbon emissions from lawn and garden activity and reduce noise levels while enhancing the well-being of South Bur-

lington's neighborhoods.

The City can also ensure community resilience by launching a Nature Based Solutions Program that includes food systems, farms, and expanded community gardens and urban farming. The City can utilize the recommendations in its [2013 South Burlington Sustainable Agriculture / Food Security Action Plan](#). This plan considers how to foster affordable, healthy, locally-grown food for City residents. It has information on how to utilize the City's remaining farmland to produce food, attract family farms and sustainable agricultural opportunities and increase sales of locally grown foods.

This program can be equitable by prioritizing neighborhoods with disproportionately low access. In addition, the City can

require regenerative, no-dig practices in City-managed community gardens and serve as an example regarding low emission soil management practices. This would also encourage regenerative, no-dig practices in residential gardens. The City Parks and Recreation Department could support this effort by offering gardening classes as a summer course option for adults and separately for children. It could provide resources such as lower cost access to materials to construct raised beds, soil/compost, gardening implements, and seeds. This can be done in neighborhoods where raised beds can be added on commonly owned land or in landscaped areas of multifamily buildings.

Nature-based solutions are important because when natural areas are healthy

and well-managed, they provide essential benefits and services to people, including increased food security.

Burlington's Nature Based Solutions program can serve as an example of what the City of South Burlington can do: <https://burlingtonwildways.org/get-involved/nature-based-climate-solutions>

All small engines, waste, and agriculture/food systems actions are outlined below.

The cost of some local, organic food is out of reach for many people and people with low incomes may not have time to garden. Policies should prioritize impacted populations and increase access and affordability to all.

Small Engines, Waste, and Agriculture/Food Systems High Impact Actions

Action	Cost	Equity	Type
Small Engines: Curtail or ban small gas powered equipment and ban leaf blowers	\$	Costs for new equip. should be considered	Policy
Waste: As a member of CSWD, reduce municipal and construction waste. Limit trash pickup to only every other week.	\$	High	Policy
Agriculture/Food Systems: Launch a Nature Based Solutions Program that includes food systems, farms, and expanded community gardens. Utilize recommendations from the South Burlington Sustainable Agriculture/Food Security Action Plan .	\$	Impacted populations should be prioritized	Promotion
Agriculture/Food Systems: Work with UVM Extension and organizations to promote food education in schools and sustainable agricultural practices that support local farms and reduce reliance on large, out of state food producers and their associated VMT.	\$	High	Promotion
Agriculture/Food Systems: Encourage food retailers to carry local products.	NA	Affordability of local products should be considered	Promotion
Agriculture/Food Systems: Promote "Vitality gardens" as a way to bring healthy seniors and younger people together around the community to grow local produce for home consumption.	NA	High	Promotion

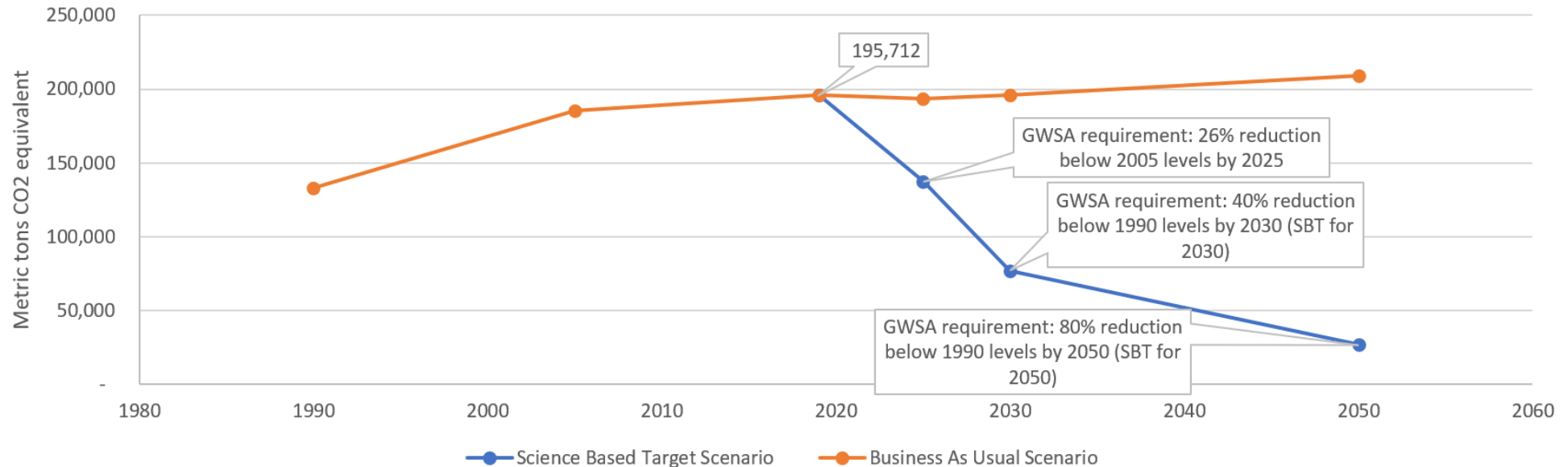
ClearPath Modeling

South Burlington established Science Based Targets (SBTs) to represent its fair share of emissions reductions necessary to meet Vermont’s Global Warming Solutions Act (GWSA) and the Paris Agreement commitment to keep global warming below 1.5 °C.

Equitably reducing global emissions by 50% requires that high-emitting, wealthy nations reduce their emissions by more than 50%.⁴ Therefore, South Burlington’s emission reduction goal is to reduce total emissions 60% by 2030. The 60% reduction from 2019 emissions by 2030 will also advance the GWSA requirement to reduce emissions 40% below 1990 levels by 2030 and will put South Burlington on track to reduce emissions by 80% below 1990 levels by 2050. The chart below shows the emissions levels needed to meet those requirements. Although not shown in Figure 11 explicitly, the City and its residents and businesses do have a long history of taking steps to weatherize buildings, drive cleaner vehicles, drive less, use transit, use energy efficient appliances, and install renewable energy generation. In order to achieve this level of emission reduction, the City, residents, and businesses must accelerate the pace of action and take bold steps to reduce energy consumption and electrify the heating and transportation sectors. The SBTs in this plan are presented as 2030, or interim, targets. See Appendix A for more information.

Figure 11

South Burlington's Historical GHG Emissions and Future Requirements



Using ICLEI's ClearPath tool, a baseline inventory of GHG emissions, a business-as-usual forecast, and science-based target (SBT) scenario was developed for South Burlington.

Baseline inventory

The baseline inventory represents residential, commercial/industrial, and transportation energy consumption along with the associated GHG emissions for the Year 2019 data to avoid capturing pandemic related data fluctuations.

Business-as-usual scenario

The business-as-usual scenario represents no climate action taken and creates a projection of emission trends based on anticipated demographic and economic changes in South Burlington.

Science-based target (SBT) scenario

SBT scenario combines the business-as-usual forecast with the emission reduction goal of 60% reduction in emissions from 2019 and various reductions actions for meeting the reduction goal.

⁴ ICLEI's Science Based Targets for U.S. Communities

The data and analysis in this section are intended to provide the City with a sense of the pace of change needed to meet the SBT target. The targets can be translated into concrete actions found in the sector specific sections. The sector specific targets form the entire reduction potential towards reducing 60% of emissions by 2030. Meaning if less of one target is achieved, other targets would need to make up the difference in emissions to meet the SBT target.

2019 Greenhouse Gas Inventory

The 2019 GHG emissions inventory provides an accounting of the primary contributors of GHG emissions within the City. The inventory is an estimate of emissions from energy consumption from thermal heating and electricity use in residential and commercial/industrial buildings, as well as from on-road vehicle miles traveled (VMT). Most of the emissions from buildings comes from natural gas for heating. Emissions from electricity is less, due to Green Mountain Power having only a small portion of their generation portfolio from fossil fuels in 2019.

On-road transportation emissions are derived from VMT for gas and diesel vehicles. Vehicle class types include motorcycles, passenger vehicles, light and heavy-duty trucks. On-road VMT emissions are attributed to the miles driven within South Burlington irrespective to where vehicles are coming from and where they are going. Meaning emissions from through traffic is part of South Burlington’s inventory. Although South Burlington policies may not be able to reduce through traffic, policies to increase EV charging stations in the City may convert some of those miles to zero emissions, especially for people shopping and working in the City.

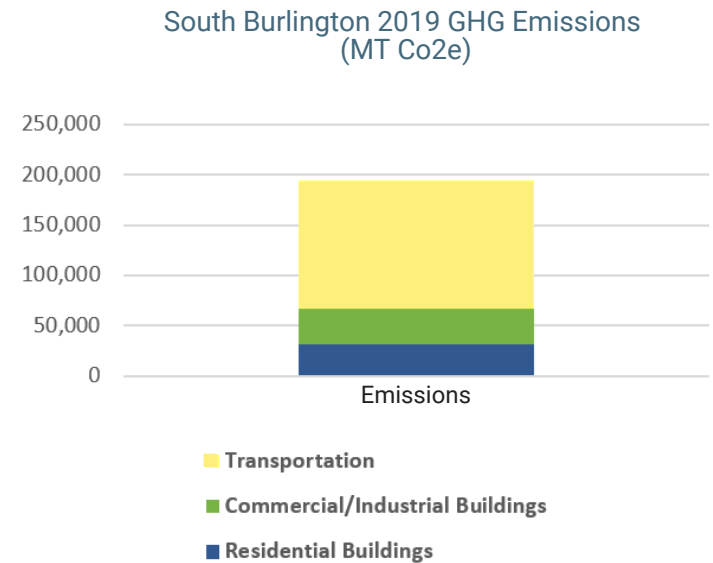
VMT data, which accounts for origin and destination, is not available regularly whereas data on miles driven within the City irrespective to origin and destination is available. Therefore, relying on data that includes pass through traffic may not reflect the audience for this plan, but it does make tracking progress on reducing VMT feasible.

Business As Usual Scenario

The business-as-usual scenario begins with the 2019 GHG inventory and creates a projection of emission trends based on population and employment growth for the year 2030. Population is assumed to increase 1.3% annually and employment 1% annually. These increases are based on past trends since 2010. The business-as-usual scenario is helpful for understanding change in emissions if climate action is not taken by the City. The business-as-usual scenario incorporates external policies, which are already in effect or will take effect between the Year 2019 and Year 2030. Green Mountain Power’s achievement of 100% carbon free electricity and decreases in carbon emissions from on-road travel because of improvements in Corporate Average Fuel Economy (CAFE) Standards have been included. VGS’s plan to add 20% renewable natural gas to their portfolio by 2030 is an existing policy that was not modeled in the business-as-usual scenario but could play a role in reducing GHG emissions from natural gas fuel usage.

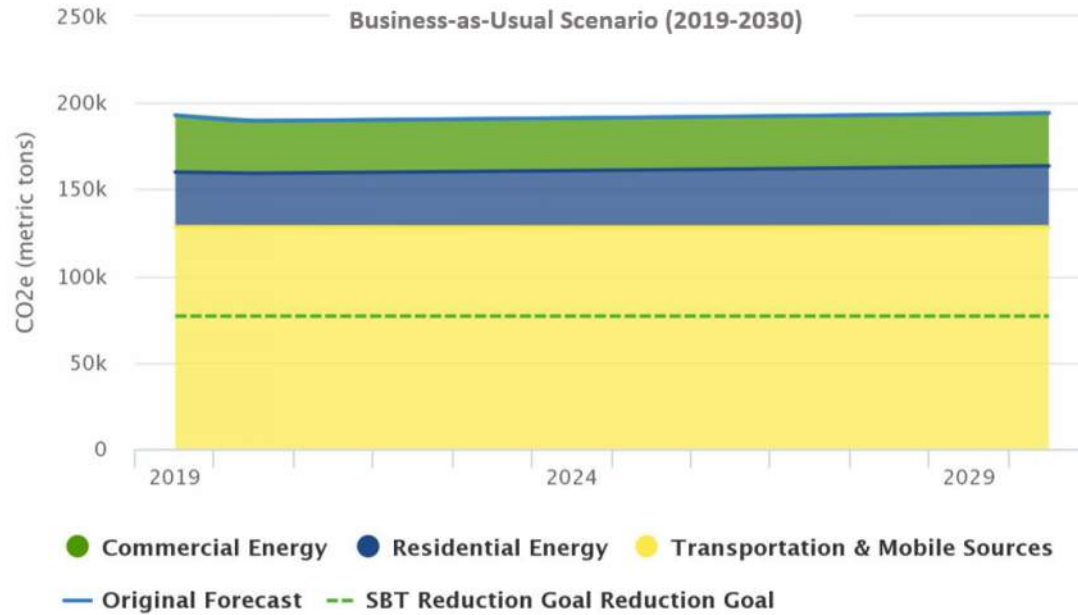
Given demographic changes and external policies, the City’s emissions will slightly increase and continue to do so if no action is taken to reduce GHG emissions. Therefore, electrifying the buildings/thermal and transportation sectors is critical to meeting South Burlington’s emission reduction target.

Figure 12



See the [climate action by sector](#) section of this plan to understand how the city plans to reduce GHG emissions.

Figure 13



Science-Based Target Scenario

The SBT scenario combines the business-as-usual forecast with the emission reduction goal of 60% reduction in emissions by 2030 from a 2019 start year for commercial energy, residential energy, and transportation energy. The SBT scenario applies a suite of actions to the business-as-usual scenario, which demonstrate the degree of implementation needed for these actions to achieve a 60% reduction in total emissions. The suite of actions is detailed in the Climate Action by Sector sections.

The SBT scenario demonstrates the magnitude of change needed to reduce emissions from residential energy, commercial energy, and transportation energy. The 2030 targets will result in the following decreased from 2019 levels.




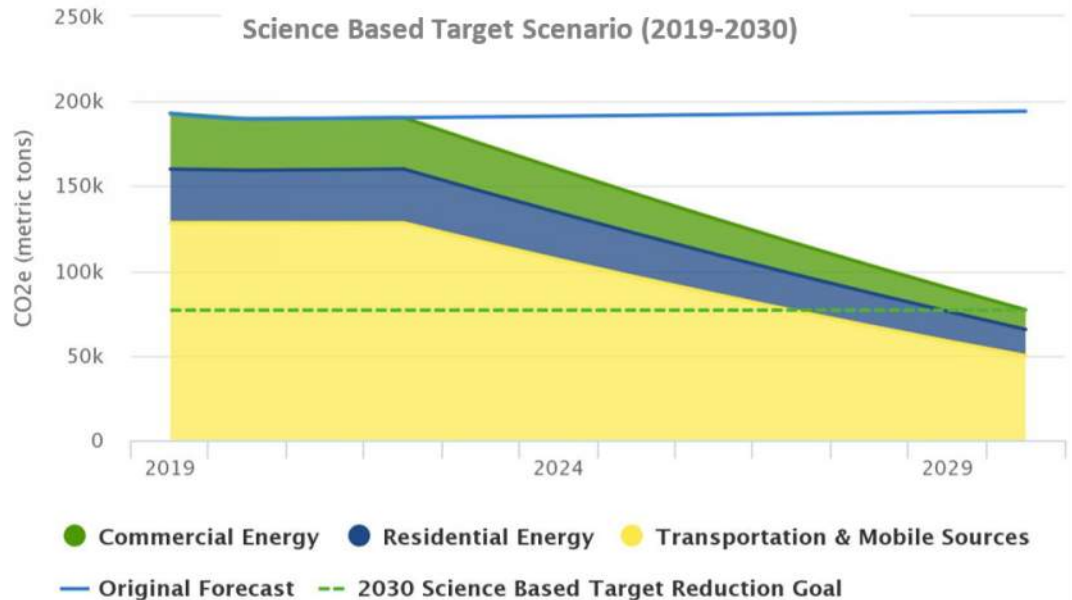
- ↓  Residential emissions decreasing by **51%**
- ↓  Commercial emission decreasing by **68%**
- ↓  Transportation emissions decreasing by **61%**

Figure 14



The actions contained in the SBT scenario are all actions that mitigate or directly reduce the City’s contribution of emissions in the land use/transportation and buildings/thermal sectors. Other sectors like natural areas, are important to climate action planning and have been included in the process through the use of the [Land Emissions and Removals Navigator \(LEARN tool\)](#). However, only forest and trees were analyzed to understand their role in mitigating climate change. Actions for the natural areas sector are also considered important for climate adaptation and resilience to help the city withstand impacts of climate change. Although the natural area sector is not modeled in the SBT scenario, modeling was conducted with the LEARN tool to understand the role forest and trees play in carbon removal and emissions on an annual basis. Additionally, data on forest conversion and forest loss is provided to understand emission impacts from development and other forest disturbances. GHG quantification of non-forested land cover (wetland, grassland, cropland) is not quantifiable due to complexities of soil carbon dynamics and methodology limitations.

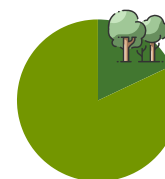
Forest and trees play a key role in removing carbon from the atmosphere through photosynthesis and plays a critical role in regulating climate. Key findings from analyzing how local changes in land use and tree canopy have contributed to South Burlington’s GHG profile are as follows⁵:



Over the period 2001 to 2019, emissions from forests being converted to development/settlement, grassland/other non-forested land, and individual trees being removed were 1,000 t CO₂e per year. The amount of emissions are based on the average carbon stock present in the forest stock prior to tree harvesting.



Over the period 2001 to 2019, forest and trees removed net -8,769 t CO₂e per year.



Approximately **18%** of South Burlington’s total land base of 10,597 acres is forest. Many areas outside of forests are also covered by trees, including an average of 17% percent tree canopy on lands outside of forest areas.

Given that the total emissions from buildings/thermal and transportation/land use, is 195,712 (MT CO₂e), the net carbon removed by trees could be applied to the total emissions to reduce emissions by the amount of 8,769 t CO₂e. Therefore, maintaining forests and trees is an effective method for removing carbon from the atmosphere and helps the city to meet the 60% reduction in total emissions.

Community Profile

When implementing actions to reduce greenhouse gas emissions and become more resilient to climate change impacts, it is important to understand the City of South Burlington in terms of demographics, commuting patterns, and housing composition. Identifying characteristics of South Burlington will help the City focus on the actions that are tailored to South Burlington. Additionally, information on who lives in South Burlington, where they work, and how they heat/cool their homes adds context to ensure that climate actions are designed with residents and business in mind for long-term impact and success.

The next page provides an overview of the demographics of the City and also highlights the communities that could be burdened by climate change and may not be able to access or afford carbon reducing technologies such as electric vehicles and heat pumps.

⁵ ICLEI’S LEARN Tool and Resources

Demographics



20,830
POPULATION



9,372
HOUSEHOLDS



2.17
AVG. SIZE
HOUSEHOLD



41.6
MEDIAN AGE



\$87,377
MEDIAN
HOUSEHOLD
INCOME



\$354,097
MEDIAN HOME
VALUE



122
WEALTH INDEX



99
HOUSING
AFFORDABILITY



36
DIVERSITY
INDEX



AT RISK POPULATION

1,858

Households With
Disability



3,851

Population 65+



782

Households
Without Vehicle



POVERTY AND LANGUAGE

5%

Households Below
the Poverty Level



471

Households Below
the Poverty Level



0

Pop. 65+ Speak
Spanish & no English



POPULATION AND BUSINESS

27,017

Daytime Population



1,469

Total Businesses



19,603

Total Employees



Language Spoken (ACS)	Age 5-17	18-64	65+	Total
English Only	2,143	10,990	3,126	16,259
Spanish	90	187	18	295
Spanish & English Well	90	178	18	286
Spanish & English Not Well	0	0	0	0
Spanish & No English	0	9	0	9
Indo-European	96	1,346	192	1,634
Indo-European & English Well	96	935	167	1,198
Indo-European & English Not Well	0	411	25	436
Indo-European & No English	0	0	0	0
Asian-Pacific Island	81	312	32	425
Asian-Pacific Island & English Well	65	249	32	346
Asian-Pacific Island & English Not Well	16	56	0	72
Asian-Pacific Island & No English	0	7	0	7
Other Language	4	39	0	43
Other Language & English Well	4	39	0	43
Other Language & English Not Well	0	0	0	0
Other Language & No English	0	0	0	0

Impacted Communities

Studies show that renters, people living in multi-unit housing, lower income and fixed income households, Black, Indigenous, and people of color, and senior citizens are those who are particularly vulnerable to the impacts of climate change. Moreover, these communities may not have the income to invest thousands of dollars for electrification and weatherization. So, it is critical to keep these communities at the forefront in climate action planning and to understand the impacted communities in South Burlington.

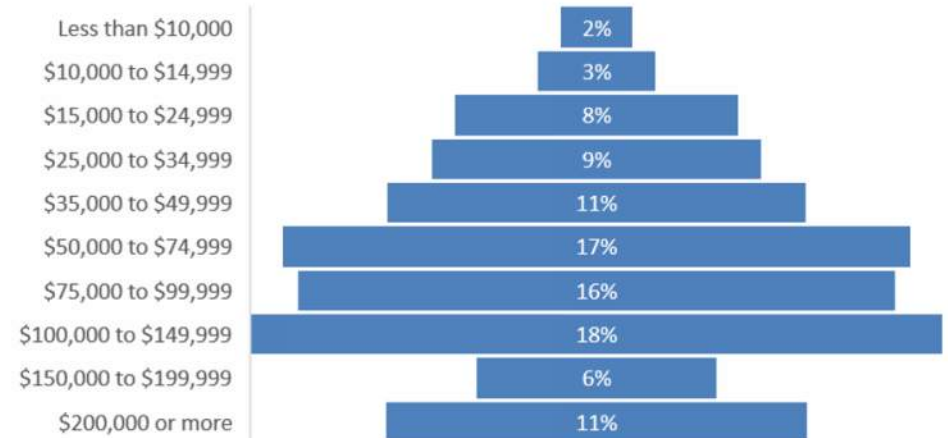
According to the 2020 American Community Survey:

- **3,683** or **19%** of people are over 65
- **6%** of households or **544** households are below the poverty level
- **752** households do not have a car
- Approximately **half** of the households earn less than the median household income, which is **\$87,377**
- **12%** of the population identifies as a race that is Black/African American, American Indian, Asian, or another race

Various programs are offered by the State of Vermont, Green Mountain Power, VGS, Efficiency Vermont, and the Champlain Valley Office of Economic Opportunity to assist income eligible households with the cost of weatherization, heat pump installation, or electric vehicle/charging equipment purchasing. It is difficult to estimate the number of households that could be eligible for these programs because each program is designed with different income eligibility and household size criteria. The programs also change annually. As shown in the data, there is a significant population in South Burlington that could be eligible for these programs and the City should work with utilities and other energy partners to promote income sensitive programs to impacted communities. The data seen here will help to inform subsequent implementation phases to climate action planning to identify the best approach to making climate action more equitable.

Figure 15

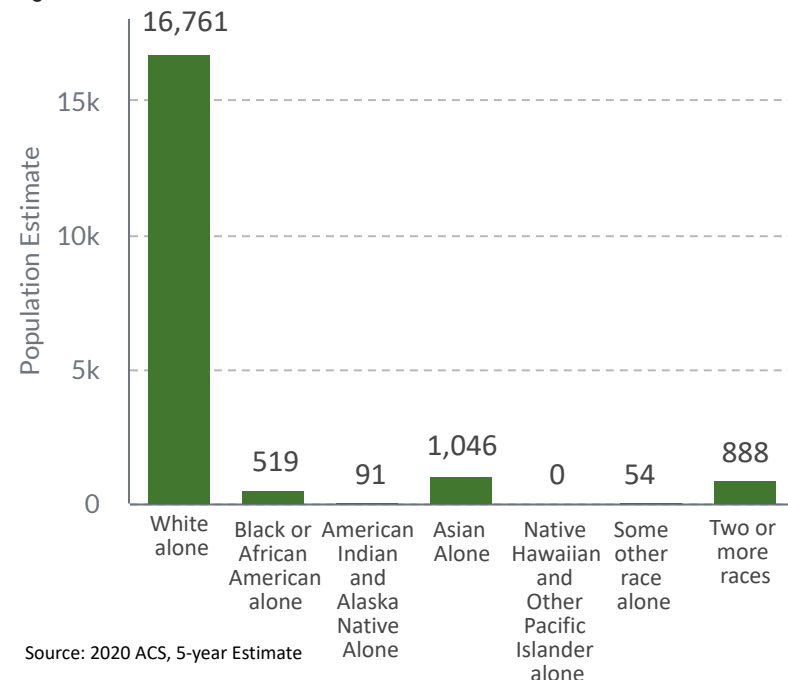
Percent of Households by Income in 2020 (Inflation Adjusted)



Source: 2020 ACS, 5-year Estimate

Figure 16

Race



Source: 2020 ACS, 5-year Estimate

Housing Composition

The composition of housing in South Burlington is important because actions to weatherize, electrify, and install electric vehicle charging will be different for each type of housing tenure and for single-unit homes vs. multi-unit homes.

Understanding that South Burlington is a City of both renters and homeowners and single-unit homes and multi-unit homes is critical for the successful implementation of the high impact actions in the buildings/thermal and transportation sectors.

In South Burlington:



60% of households are **owner** occupied

40% of households are **renter** occupied



42% of homes are **multi-unit** homes (includes condos, attached dwelling units)

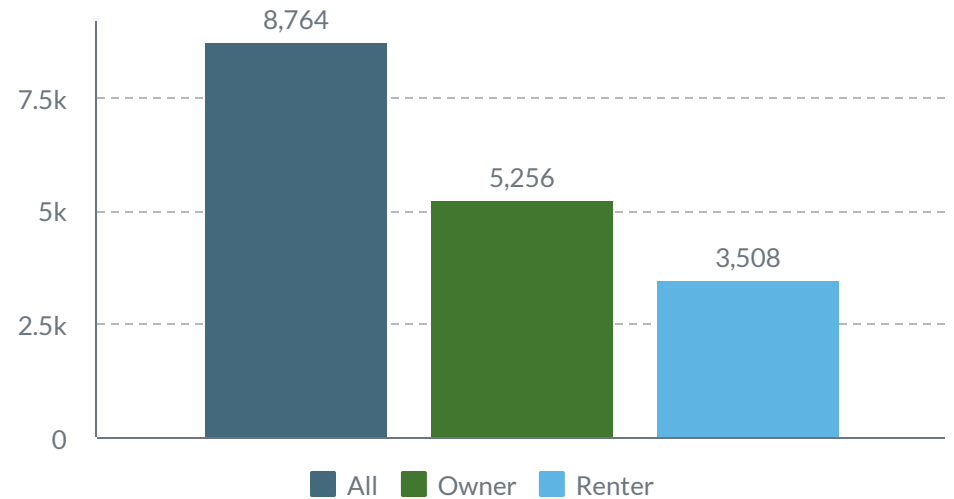
58% are **single unit** homes

For example, renters may not have the ability to make weatherization improvements to their homes because they are not the owner, and the cost/benefit may not be great enough to encourage the property owner to make changes. Additionally, energy improvements to multi-unit properties are more challenging and could potentially involve homeowner associations and other third parties. As such any action implemented should seek to form a collaborative partnership between the City, utilities, property owners, and others.

Although homeowners could renovate their homes to use a cleaner fuel source or install EV charging more so than renters, they may not have the capital to do so. Therefore, it is key for buildings/thermal and transportation actions to include financial incentives for homeowners, as well as property owners of rental units.

Figure 17

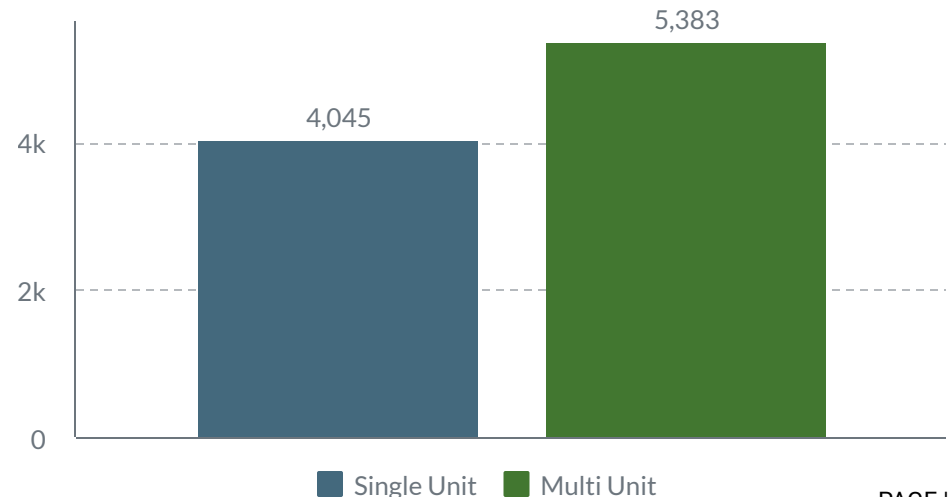
Estimated Number of Households
South Burlington, 2019



Source: ACS 2015-2019

Figure 18

Housing Stock as of Year 2020



Source: CCRPC Housing Database

Commuting Patterns

As indicated in previous section, transportation makes up 65% of greenhouse gas emissions in South Burlington. These emissions come from residents traveling in gasoline or diesel-powered vehicles to get to work, school, and services. These emissions also come from commuters coming into South Burlington to get to their jobs.

In total about 20,000 people work in South Burlington. About 87% or 17,639 of these employees live outside of South Burlington but travel to South Burlington from elsewhere. The remaining 13% or 2,613 employees live and work in South Burlington.

The commuting patterns of South Burlington employees present an opportunity to work with businesses to reduce emissions from transportation.

Employers and their employees can reduce emissions by either:



Driving an electric vehicle



Working remotely



Taking transit



Carpooling

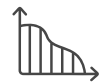


Walking / biking

Employers can incentivize their employees to make their commutes more energy efficient by:



Installing electric vehicle charging equipment, and



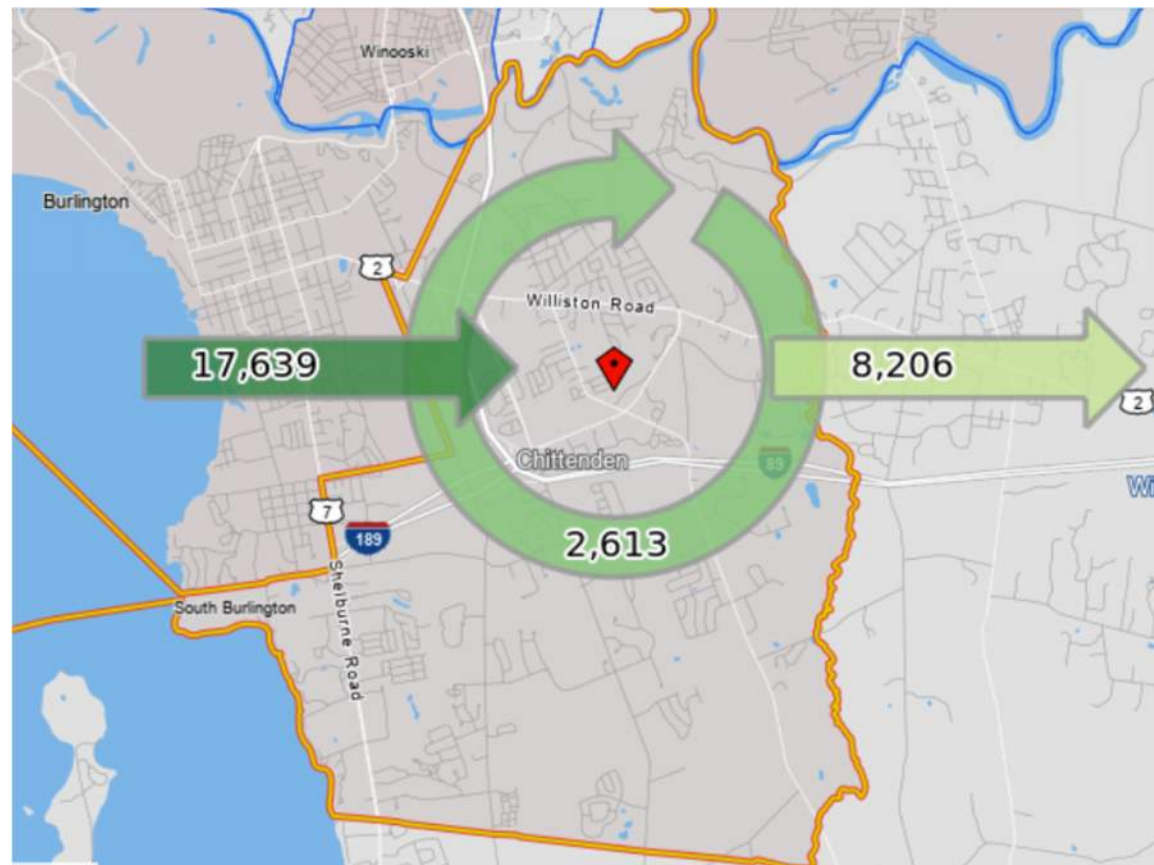
partnering with CATMA to educate employees about ways to reduce their daily commuting miles.



Additionally, prioritizing higher density in areas served by transit could entice workers to give up their long commutes and make South Burlington the place where they live and work.



Enhancements to transit services offered by Green Mountain Transit coupled with key locations of park and rides are also another approach to getting people to change their daily commutes and reduce greenhouse gas emissions.



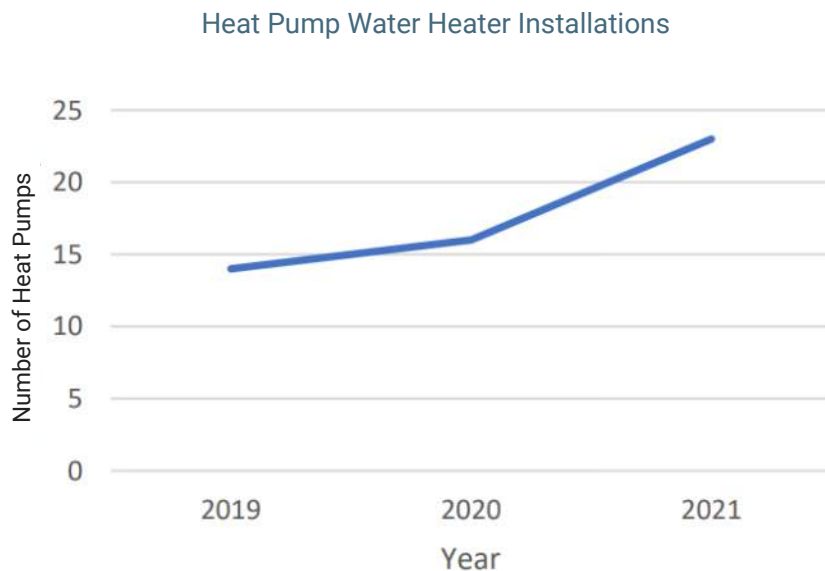
Source: LEHD, on the map

Fuel Source for Heating

The City of South Burlington is served by VGS. VGS provides a majority of owner-occupied and renter occupied homes with natural gas. A small portion of owner-occupied homes are using wood for a heating source compared to no renter-occupied homes using wood at all. Both owner-occupied and renter-occupied homes are using electricity for a heat source. However, information on the type of technology used with electricity for heating is not available. Homes could be using legacy electric resistance heat or homes could be using cold climate heat pumps powered by electricity.

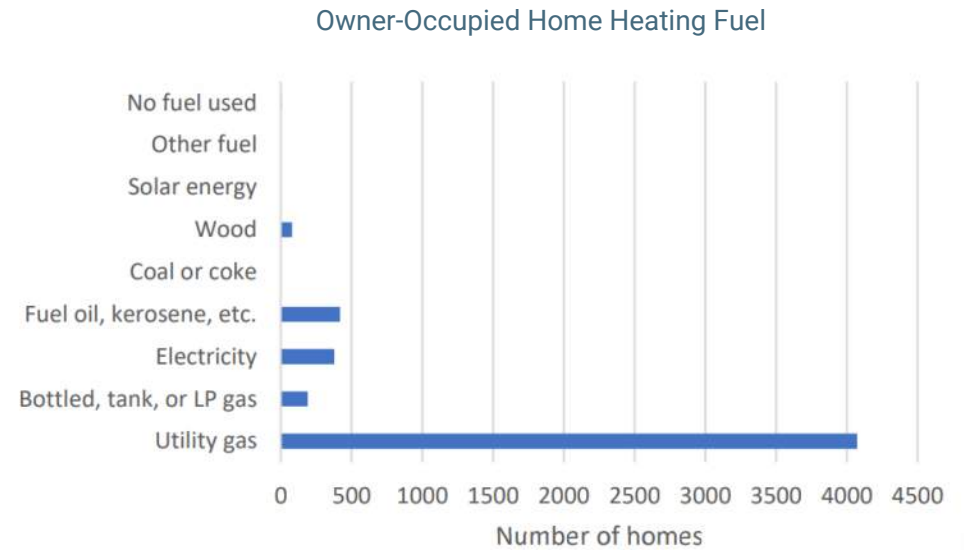
South Burlington saw an uptick in cold climate heat pumps installed in the last three years, which indicates that a portion of the homes heating with electricity are using cold climate heat pumps. A small portion of both renter-occupied homes and owner-occupied homes are relying on delivered fuels or fuel oil to heat their homes. Either these homes have not yet switched over to natural gas or natural gas is not available in their neighborhood.

Figure 19



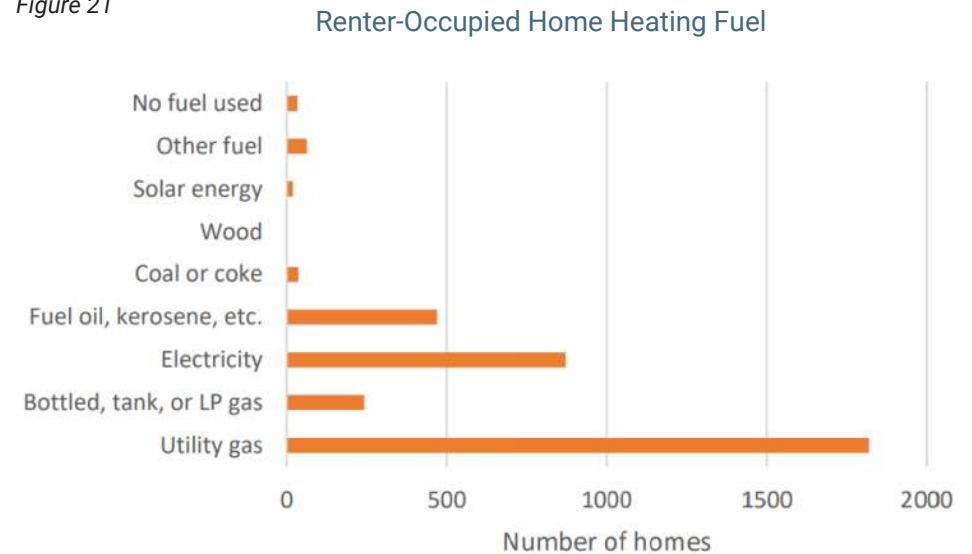
Source: Efficiency Vermont RPC Report 2021

Figure 20



Source: American Community Survey 5-year estimate (2016-2020), margin of error is associated with these data

Figure 21



Source: American Community Survey 5-year estimate (2016-2020), margin of error is associated with these data

Annual Monitoring

Effective and transparent monitoring is vital to understanding and communicating the progress of the actions set out in this plan. Annual monitoring should be consistent with the data and analysis in this plan. The 2030 targets included in the sector-based sections should be used as the basis for annual tracking of implementation to demonstrate progress in achieving the targets. Information for measuring progress can be qualitative or quantitative depending on the sector. For example, quantitative data is more readily available for the buildings/thermal, transportation/land use, and city government operations sectors than is available for the natural areas, agriculture, and waste. Although quantitative data may not be available it is still important to track progress made in these sectors with descriptive information if available. Monitoring should also focus on ways to track whether equity considerations are being included in ongoing implementation.

Implementations of Actions and Next Steps

Once the Climate Action Plan is complete, the transportation sector and city government operations sector will be studied, and a more detailed implementation plan will be developed for each. The City plans to work with a transportation consultant and the Chittenden County Regional Planning Commission on the transportation sector implementation plan. The City was also awarded a State of Vermont municipal planning grant to develop an implementation plan for the City government operations sector. Additionally in August 2022, the CAPTF proposed to the City Council adoption of a carbon free heating and hot water ordinance to reduce GHG emissions in new buildings. It is anticipated that the equity recommendations and considerations identified in this plan will be a center point of the sector-based implementation plans. Plans for the remaining sectors will be developed as funds become available. The CAPTF recognizes that implementation costs are monumental and therefore asks the City to embed the 2030 targets and considerations into all decision making, especially as part of the City's budget.

Appendix A: ClearPath Modeling Data

SBTs and Emission Goals	2030 Emission Reduction Goal	Base Year 2019 (MT Co2e)	2030 BAU (MT Co2e)	2030 SBTs and GWSA (MT Co2e)
	60.20%	195,712	196,253	77,894
Growth Rates	Employment	Population	Grid Emissions	VMT
	1% annually	1.3% annually	0	1.3% annually

Fuel/Sector	Base Year Year 2019 (MT Co2e)	BAU 2030 (MT Co2e)	SBT 2030 Modeled Emissions Science Based Target (MT CO2e)	Sector
Commercial/Industrial Natural Gas	32,319	32,676	11,548	Commercial Energy
Commercial/Industrial Electric	3,378	0		
Residential Electric	1,048	0	15,573	Residential Energy
Residential Natural Gas	30,630	35,306		
On-Road Transportation	128,337	128,271	49,832	Transportation
Total	195,712	196,253	76,953	

Forest Tree Disturbances/Forest to Settlement COe2/yr	1,000	1,000	1,000	Land Use
CO2 e/yr Removal from Undisturbed Forest/Trees in Settled Areas	-8,769	-8,769	-8,769	Natural Areas
Net Total	187,943	188,484	69,184	

**Degree of Implementation
(Start Year 2023, End Year 2030)**

Measures	SBT Scenario	Emission Reductions (MT CO2e)	Percent Reduction in Sector Emissions
Residential Electrification/Number of Housing Units Retrofitted (annual)	360 housing units	10,140	9%
Home Weatherization (annual)	600 homes	5,565	5%
2030 District (Commercial Benchmarking, Electrification (annual))	8% commercial sq. ft annually	20,108	17%
Electric Vehicle Adoption, by 2030	37.5% EV, 37.5% HEV	50,377	42%
VMT Reduction Annually	2.5%	22,491	19%
Compact Development	New Units (2,7770 units in high density (> 12.5 du per acre)	5,341	4%
Fossil Fuel Free Heating Ordinance for new buildings	143 new homes per year, 53,000 square feet	5,048	4%

Appendix B: Glossary of Climate Change Terms

Source: U.S. Environmental Protection Agency

Adaptation

Adjustment or preparation of natural or human systems to a new or changing environment which moderates harm or exploits beneficial opportunities.

Biofuels

Gas or liquid fuel made from plant material. Includes wood, wood waste, wood liquors, peat, railroad ties, wood sludge, spent sulfite liquors, agricultural waste, straw, tires, fish oils, tall oil, sludge waste, waste alcohol, municipal solid waste, landfill gases, other waste, and ethanol blended into motor gasoline.

Carbon Dioxide

A naturally occurring gas, and also a by-product of burning fossil fuels and biomass, as well as land-use changes and other industrial processes. It is the principal human caused greenhouse gas that affects the Earth's radiative balance. It is the reference gas against which other greenhouse gases are measured and therefore has a Global Warming Potential of 1.

Carbon Sequestration

Terrestrial, or biologic, carbon sequestration is the process by which trees and plants absorb carbon dioxide, release the oxygen, and store the carbon. Geologic sequestration is one step in the process of carbon capture and sequestration (CCS), and involves injecting carbon dioxide deep underground where it stays permanently.

Carbon Capture and Sequestration

Carbon capture and sequestration (CCS) is a set of technologies that can greatly reduce carbon dioxide emissions from new and existing coal- and gas-fired power plants, industrial processes, and other stationary sources of carbon dioxide. It is a three-step process that includes capture of carbon dioxide from power plants or industrial sources; transport of the captured and compressed carbon dioxide (usually in pipelines); and underground injection and geologic sequestration, or permanent storage, of that carbon dioxide in rock formations that contain tiny openings or pores that trap and hold the carbon dioxide.

Climate

Climate in a narrow sense is usually defined as the "average weather," or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands of years. The classical period is 3 decades, as defined by the World Meteorological Organization (WMO). These quantities are most often surface variables such as temperature, precipitation, and wind. Climate in a wider sense is the state, including a statistical description, of the climate system.

Climate Change

Climate change refers to any significant change in the measures of climate lasting for an extended period of time. In other words, climate change includes major changes in temperature, precipitation, or wind patterns, among others, that occur over several decades or longer.

Deforestation

Those practices or processes that result in the conversion of forested lands for non-forest uses. Deforestation contributes to increasing carbon dioxide concentrations for two reasons: 1) the burning or decomposition of the wood releases carbon dioxide; and 2) trees that once removed carbon dioxide from the atmosphere in the process of photosynthesis are no longer present.

Ecosystem

Any natural unit or entity including living and non-living parts that interact to produce a stable system through cyclic exchange of materials.

Emissions

The release of a substance (usually a gas when referring to the subject of climate change) into the atmosphere.

Emissions Factor

A unique value for scaling emissions to activity data in terms of a standard rate of emissions per unit of activity (e.g., grams of carbon dioxide emitted per barrel of fossil fuel consumed, or per pound of product produced).

Energy Efficiency

Using less energy to provide the same service.

ENERGY STAR

A U.S. Environmental Protection Agency voluntary program that helps businesses and individuals save money and protect our climate through superior energy efficiency. [Learn more about ENERGY STAR.](#)

Fossil Fuel

A general term for organic materials formed from decayed plants and animals that have been converted to crude oil, coal, natural gas, or heavy oils by exposure to heat and pressure in the earth's crust over hundreds of millions of years.

Fuel Switching

In general, this is substituting one type of fuel for another. In the climate-change discussion it is implicit that the substituted fuel produces lower carbon emissions per unit energy produced than the original fuel, e.g., natural gas for coal.

Global Average Temperature

An estimate of Earth's mean surface air temperature averaged over the entire planet.

Global Warming

The recent and ongoing global average increase in temperature near the Earth's surface.

Global Warming Potential

A measure of the total energy that a gas absorbs over a particular period of time (usually 100 years), compared to carbon dioxide.

Greenhouse Effect

Trapping and build-up of heat in the atmosphere (troposphere) near the Earth's surface. Some of the heat flowing back toward space from the Earth's surface is absorbed by water vapor, carbon dioxide, ozone, and several other gases in the atmosphere and then reradiated back toward the Earth's surface. If the atmospheric concentrations of these greenhouse gases rise, the average temperature of the lower atmosphere will gradually increase.

Greenhouse Gas (GHG)

Any gas that absorbs infrared radiation in the atmosphere. Greenhouse gases include, [carbon dioxide](#), [methane](#), [nitrous oxide](#), [ozone](#), [chlorofluorocarbons](#), [hydrochlorofluorocarbons](#), [hydrofluorocarbons](#), [perfluorocarbons](#), [sulfur hexafluoride](#).

Habitat Fragmentation

A process during which larger areas of habitat are broken into a number of smaller patches of smaller total area, isolated from each other by a matrix of habitats unlike the original habitat.

Heat Island

An urban area characterized by temperatures higher than those of the surrounding non-urban area. As urban areas develop, buildings,

roads, and other infrastructure replace open land and vegetation. These surfaces absorb more solar energy, which can create higher temperatures in urban areas.

Heat Waves

A prolonged period of excessive heat, often combined with excessive humidity.

Intergovernmental Panel on climate Change (IPCC)

The IPCC was established jointly by the United Nations Environment Programme and the World Meteorological Organization in 1988. The purpose of the IPCC is to assess information in the scientific and technical literature related to all significant components of the issue of climate change. The IPCC draws upon hundreds of the world's expert scientists as authors and thousands as expert reviewers. Leading experts on climate change and environmental, social, and economic sciences from some 60 nations have helped the IPCC to prepare periodic assessments of the scientific underpinnings for understanding global climate change and its consequences. With its capacity for reporting on climate change, its consequences, and the viability of adaptation and mitigation measures, the IPCC is also looked to as the official advisory body to the world's governments on the state of the science of the climate change issue. For example, the IPCC organized the development of internationally accepted methods for conducting national greenhouse gas emission inventories.

Landfill

Land waste disposal site in which waste is generally spread in thin layers, compacted, and covered with a fresh layer of soil each day.

Natural Gas

Underground deposits of gases consisting of 50 to 90 percent methane (CH₄) and small amounts of heavier gaseous hydrocarbon compounds such as propane (C₃H₈) and butane (C₄H₁₀).

Recycling

Collecting and reprocessing a resource so it can be used again. An example is collecting aluminum cans, melting them down, and using the aluminum to make new cans or other aluminum products.

Reforestation

Planting of forests on lands that have previously contained forests but that have been converted to some other use.

Renewable Energy

Energy resources that are naturally replenishing such as biomass, hydro, geothermal, solar, wind, ocean thermal, wave action, and tidal action.

Resilience

A capability to anticipate, prepare for, respond to, and recover from significant multi-hazard threats with minimum damage to social well-being, the economy, and the environment.

Sink

Any process, activity or mechanism which removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas or aerosol from the atmosphere.

Soil Carbon

A major component of the terrestrial biosphere pool in the carbon cycle. The amount of carbon in the soil is a function of the historical vegetative cover and productivity, which in turn is dependent in part upon climatic variables.

Vulnerability

The degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed; its sensitivity; and its adaptive capacity.

Wastewater

Water that has been used and contains dissolved or suspended waste materials.

Weather

Atmospheric condition at any given time or place. It is measured in terms of such things as wind, temperature, humidity, atmospheric pressure, cloudiness, and precipitation. In most places, weather can change from hour-to-hour, day-to-day, and season-to-season. Climate in a narrow sense is usually defined as the "average weather", or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands or millions of years. The classical period is 30 years, as defined by the World Meteorological Organization (WMO). These quantities are most often surface variables such as temperature, precipitation, and wind. Climate in a wider sense is the state, including a statistical description, of the climate system. A simple way of remembering the difference is that climate is what you expect (e.g. cold winters) and 'weather' is what you get (e.g. a blizzard).

Appendix C: Actions

Appendix C contains all the actions identified by the CAPTF. The actions are categorized by sector and by either high impact action or supporting actions. Each action is also associated with a pathway, a science-based target, a monitoring metric, ID #, and an action type. A pathway is a high-level means of achieving GHG emissions or adaptation goals. A science-based target is the target required for South Burlington to meet its share of emission reductions in accordance with South Burlington's goals. The monitoring metric is a data point to measure progress towards meeting the science-based target. Actions are categorized into policies (including resolutions, law and regulations), promotions (e.g., advertising and marketing) and investment (including municipal spending and incentives). Actions are the "operational" tasks the City will undertake to support the pathways and achieve the science-based targets.

Buildings/Thermal Actions

VT Cap /Sector	Pathway	2030 Science Based Target	Monitoring Metric	Action Category	ID	Draft Action	High Impact or Supporting
Buildings/ Thermal	B.1: Building Performance Standards/ Weatherization	By 2030, weatherize 600 existing homes annually to reduce emissions by 5% including existing Multifamily Residential Buildings under management, including condominiums, townhomes, and rental properties	Number of buildings weatherized	Policy	B-1.1	Establish a program with utilities (GMP, Efficiency VT and VT Gas) to grade & prioritize buildings on weatherization potential	Supporting
					B-1.2	Develop an energy efficiency ordinance to mandate weatherization in high energy use buildings similar to Burlington's Minimum Housing Code Weatherization Ordinance.	High Impact
					B-1.3	City to become a 2030 District (https://www.2030districts.org/). This is a private/public partnership working to reduce building energy consumption, water use and transportation emissions 50% by 2030. Program targets larger commercial and multi-family buildings, benchmarks energy use, and sets reduction targets.	High Impact
				Promotion	B-1.4	Encourage low GHG emitting materials in weatherization processes. Advocate for the State to establish guidelines to recognize and incentivize low GHG emitting materials.	Supporting
					B-1.5	Promote and collaborate with CVOEO and other partners to target and assist income eligible residents with building weatherization. Additionally, if successful, consider expanding the airport area weatherization program to other areas of the City.	Supporting
					B-1.6	Support fuel dealers and utilities in implementing the proposed Clean Heat Standard	High Impact
	By 2030, weatherize 600 existing homes annually to reduce emissions by 5%	Number of homes weatherized	Policy	B-1.7	Establish a program with utilities (GMP, Efficiency VT and VT Gas) to grade & prioritize homes on weatherization potential	Supporting	
				B-1.8	Establish a weatherization ordinance for existing single family homes. (similar to Burlington's code for rental housing)	Supporting	
				B-1.9	Require energy disclosure at sale/title transfer of existing single family homes	Supporting	
				Promotion	B-1.10	Encourage low GHG emitting materials in weatherization processes. Advocate for the State to establish guidelines to recognize and incentivize low GHG emitting materials.	Supporting

Buildings/Thermal Actions

VT Cap /Sector	Pathway	2030 Science Based Target	Monitoring Metric	Action Category	ID	Draft Action	High Impact or Supporting	
					B-1.11	Promote and collaborate with CVOEO and other partners to target and assist income eligible residents with building weatherization. Additionally, if successful, consider expanding the airport area weatherization program to other areas of the City.	Supporting	
					B-1.12	Dedicate City resources to promote and educate residents, businesses, and property owners about buildings/thermal actions in this list.	Supporting	
					B-1.13	Educate home owners on the difference between investment grade energy audits and free walk throughs	Supporting	
					B-1.14	Promote specific incentives available for buildings in one place. Provide dedicated page on website. Post link clean home heating and cooling guide. https://www.cesa.org/wp-content/uploads/A-Vermonters-Guide-to-Residential-Clean-Heating-and-Cooling.pdf	Supporting	
					B-1.15	Support fuel dealers and utilities in implementing the proposed Clean Heat Standard	High Impact	
					Investment	B-1.16	Identify residential buildings that are not VT GAS customers/eligible for VT GAS energy audit and provide city resources to perform energy audits on these buildings.	Supporting
						B-1.17	City support for energy audits and IR scanning equipment	Supporting
	B-2: Electrification of Existing Infrastructure	Electrify 8% of existing commercial/industrial square footage annually to reduce emissions by 17%	Number of commercial buildings electrified	Policy	B-2.1	City to become a 2030 District (https://www.2030districts.org/). This is a private/public partnership working to reduce building energy consumption, water use and transportation emissions 50% by 2030. Program targets larger commercial and multi-family buildings, benchmarks energy use, and sets reduction targets.	High Impact	
					B-2.2	Develop preferential tax rate or other incentive for highly efficient commercial buildings not using fossil fuels.	High Impact	
					Promotion	B-2.3	Promote 2030 District program to SBBA and other businesses	Supporting
						B-2.4	Promote specific incentives available for buildings in one place. Provide dedicated page on website. Post link clean home heating and cooling guide. https://www.cesa.org/wp-content/uploads/A-Vermonters-Guide-to-Residential-Clean-Heating-and-Cooling.pdf	Supporting

Buildings/Thermal Actions

VT Cap /Sector	Pathway	2030 Science Based Target	Monitoring Metric	Action Category	ID	Draft Action	High Impact or Supporting	
					B-2.5	Support fuel dealers and utilities in implementing the proposed Clean Heat Standard	High Impact	
		Electrify 360 existing housing units annually to reduce emissions by 9% including existing Multifamily Residential Buildings under management, including condominiums, townhomes, and rental properties	Number of multifamily homes electrified	Policy	B-2.6	Recognize properties for phasing out/reduction of fossil fuels.	Supporting	
					B-2.7	Develop preferential tax rate or other incentive for highly efficient multifamily buildings not using fossil fuels.	High Impact	
					Promotion	B-2.8	Promote with recognition and rewards for property owners adopting electrification	Supporting
						B-2.9	Promote specific incentives available for buildings in one place. Provide dedicated page on website. Post link clean home heating and cooling guide. https://www.cesa.org/wp-content/uploads/A-Vermonters-Guide-to-Residential-Clean-Heating-and-Cooling.pdf	Supporting
						B-2.10	Support fuel dealers and utilities in implementing the proposed Clean Heat Standard	High Impact
						B-2.11	Educate home owners on the difference between investment grade energy audits and free walk throughs	Supporting
				Electrify 360 existing housing units annually to reduce emissions by 9% including existing Single family homes	Number of single-family homes electrified	Policy	B-2.12	Recognize properties for phasing out/reduction of fossil fuels.
			B-2.13			Develop preferential tax rate or other incentive for highly efficient homes not using fossil fuels.	High Impact	
			Promotion			B-2.14	Promote and collaborate with CVOEO and other partners to target and assist income eligible residents with building weatherization and electrification projects. Additionally, if successful, consider expanding the airport area weatherization program to other areas of the City.	Supporting
						B-2.15	Promote successful South Burlington businesses that perform electrification and solar projects (also add this to renewable energy sector?)	Supporting
						B-2.16	Promote specific incentives available for buildings in one place. Provide dedicated page on website. Post link clean home heating and cooling guide. https://www.cesa.org/wp-content/uploads/A-Vermonters-Guide-to-Residential-Clean-Heating-and-Cooling.pdf	Supporting

Buildings/Thermal Actions

VT Cap /Sector	Pathway	2030 Science Based Target	Monitoring Metric	Action Category	ID	Draft Action	High Impact or Supporting		
					B-2.17	Support fuel dealers and utilities in implementing the proposed Clean Heat Standard	High Impact		
	B-3: Net Zero for New Infrastructure	By 2025, establish a Net Zero Building Code for new construction, residential and commercial.	Percentage of net-zero new buildings	Policy	B-3.1	Collaborate with VGS and identify timeframe and path for legislature driven regulation	High Impact		
B-3.2					Prohibit fossil fuel use in new buildings. Work with VGS to determine time-frame and work with City Attorney and/or legislature to determine a path to regulation.	High Impact			
B-3.3					Establish and adopt a City building Code and hire code inspector in order to ensure building energy code compliance	High Impact			
						Promotion	B-3.4	Adopt Net Zero Building Code	High Impact
					B-3.5		Showcase Net Zero projects, to help builders learn and secure EVT incentives for Net Zero. Recognize builders with proven Net zero projects.	Supporting	
					B-3.6		Encourage low GHG emitting materials in weatherization processes. Advocate for the State to establish guidelines at recognize and incentivize low GHG emitting materials.	Supporting	
					B-3.7		Promote net zero building standards and work with contractors and builders to meet net zero requirements	Supporting	
					B-3.8		Educate community on the need for Net zero buildings	Supporting	
						Investment	B-3.9	Dedicate City resources to promote and educate residents, businesses, and property owners about buildings/thermal actions in this list.	Supporting
					B-3.10		Invest resources for energy code and electrification standard enforcement	Supporting	
				Promotion		Promote and educate whole home energy efficiency measures to reduce overall energy use. Measures include energy efficient appliances, lighting, and smart thermostats.	Supporting		

Transportation/Land Use Actions

VT Cap/Sector	Pathway	2030 Science Based Target	Monitoring Metric	Action Category	ID	Draft Action	High Impact or Supporting
Transportation/ Land Use	T.1: Vehicle Electrification and Efficiency	Replace 75% of gas vehicles with all electric vehicles (EVs) and plug-in hybrid vehicles to reduce emissions by 42%	# of EVs registered and # of new EV charging stations added annually, and actions that have advanced transportation efficiency	Policy	T.1.1	Work with a consultant to inventory current multi-family electric vehicle charging network needs/capabilities to inform a policy for existing multifamily properties to install electric vehicle charging equipment. The policy could include an incentive program for rental owners to allocate space for charging station.	Supporting
					T.1.2	Adopt a policy to require (i.e. building code or zoning regulation) all new buildings be built with the appropriate amount of electric vehicle charging equipment and 200-amp electric service . Work with Drive Electric Vermont and/or Green Mountain Power to determine the appropriate amount.	High Impact
					T.1.3	Partner with GMP to speed up EV adoption in South Burlington including siting, make-ready infrastructure, fast charging stations, and incentives.	High Impact
				Promotion	T.1.4	Educate student drivers about eco-driving, electric and high efficiency vehicle and transportation options including electric bikes.	Supporting
					T.1.5	Utilize Drive Electric VT resources and car dealerships to offer the community education opportunities about electric vehicles. Educate consumers about EV incentives being offered by utilities, Mileage Smart, and other programs.	Supporting
				Policy	T.1.6	Work with CarShareVT to consider expanding EV car share program to South Burlington.	Supporting
	T.2: Reduce Vehicle Miles Traveled (VMT)	Reduce vehicle miles traveled by 2.5% annually to reduce emissions by 19% Plan for compact high density to reduce emissions by 4%	VMT quantified annually from VINS registered to SB residents, utilizing DMV data	Policy	T.2.1	Work with the school district to develop a policy for discouraging driving to school (disincentives) and encouraging students to ride the bus, bike, or walk to reduce single occupancy driving to school.	Supporting
					T.2.2	Create policy to reduce duplication of service from solid waste haulers. Include enforcement mechanism.	Supporting
					T.2.3	Research the applicability for micro-transit programs in South Burlington. Consider working with SSTA, Senior Van Services	High Impact

Transportation/Land Use Actions

VT Cap/Sector	Pathway	2030 Science Based Target	Monitoring Metric	Action Category	ID	Draft Action	High Impact or Supporting
					T.2.4	Maintain existing bike/ped infrastructure used for transportation purposes including snow removal to ensure it can be utilized during all seasons.	Supporting
					T.2.5	Work with the School District and Safe to Routes to School to adopt a policy to encourage more biking/walking to school.	Supporting
					T.2.6	Foster basic services to exist within ½ mile of neighborhoods.	Supporting
					T.2.7	Adopt a Transportation Demand Management requirement for development/redevelopment. Include incentives or requirements for multi-modal transportation or parking maximums where feasible, parking disincentives or other tools. Include bike share, car share, and supporting city policies.	Supporting
					T.2.8	Prioritize higher density, mixed use development and affordable housing through the land development regulations in areas with existing or planned reliable transit options, services, and infrastructure (including bike/ped) within the transit overlay district.	High Impact
					T.2.9	Create higher density housing to minimize vehicles miles traveled from employees commuting to South Burlington by creating denser housing in the transit overlay district.	Supporting (connected to 2.8)
					T.2.10	Decrease pressure to build on undeveloped land, encourage conversion of existing single family homes to multi-family homes and renovations to add studios or one-bedroom apartments to existing homes. Prioritize use of this new housing for long-term rentals over short-term rentals.	Supporting
					T.2.11	Develop parking maximums	High Impact
					T.2.12	Create a walk/bike master plan, recommend investments in retrofits of infrastructure, including widening or narrowing where needed and consideration of making bike/pedestrian infrastructure safer.	High Impact
				Promotion	T.2.13	Partner with CATMA to increase membership among employers (City Government, Senior Center, School District, and large employers/collection of employers) in the City to reduce driving alone to work and encourage transit use through reduced fares, carpooling, telecommuting, and walking/biking/bike sharing, bike storage, and showers. Offer rewards for employees who do this.	High Impact (connected to 2.8)

Transportation/Land Use Actions

VT Cap/Sector	Pathway	2030 Science Based Target	Monitoring Metric	Action Category	ID	Draft Action	High Impact or Supporting
					T.2.14	Survey residents on approaches for encouraging bus ridership. Approaches could include advocating for free ridership.	Supporting
					T.2.15	City events reinforce transportation goals, such as Open Streets event (perhaps closing northbound lane of Dorset Street and/or Market Street) or showcase bike path with an annual event (marathon/half marathon/5k)	Supporting
					T.2.16	Invest in Green Mountain Transit to increase transit ridership on existing route, identify new routes, and increase frequency.	High Impact
					T.2.17	Increase bike/ped infrastructure (routes, bike parking, signage, and striping) city wide to connect all neighborhoods in South Burlington and to adjacent communities in support of a walk/bike master plan.	Supporting
					T.2.18	Where feasible and safe, reduce travel lanes to accommodate bike lanes	High Impact
					T.2.19	Establish park & ride/carpool lots to connect with public transportation, (e.g. I-189 Exit, Chittenden County Park and Ride Plan). Identify synergies with I89 Corridor Project.	High Impact

Renewable Energy, Natural Areas, Adaptation, City Gov Ops, Agriculture Actions

Sector	Pathway	2030 Science Based Target	Monitoring Metric	Action Category	ID	Draft Action	High Impact or Supporting
Renewable Energy	R.1: Increase renewable energy generation in the City	By 2030, Increase renewable energy by x% (ECOS Plan Target indicates an additional 71,853 to 129, 616 MWH is needed by 2050 to advance the State's 90X2050 goal,	% increase in Megawatt Hours	Policy	R.1.1	Adopt a policy to require qualifying new buildings to be built with solar or other renewable net metered systems/paired with energy storage to increase resiliency/reliability of electrical system during outages and decrease fossil fuel usage during peak periods.	Supporting
					R.1.2	Update the Comprehensive Plan according to the Dept. of Public Service Energy Planning Standards for renewable energy standards (Act 174).	Supporting
					R.1.3	Identify existing commercial roofs, parking areas and other areas that do not currently provide carbon sequestration or storage, wildlife habitat, water filtration, etc. where solar arrays would be compatible and should be prioritized.	Supporting
					R.1.4	City to adopt "solar access law" similar to Boulder, Co. to require new PUDs and subdivisions to orient residential units to maximize solar access and be structurally capable of supporting solar collectors. See 9-9-17 (g) at: https://library.municode.com/co/boulder/codes/municipal_code?nodeId=T	Supporting
				Strategic Investment	R.1.5	Create a program to incentivize residents and businesses to install solar arrays on their roofs, over parking lots, or as appropriate as free-standing structures	Supporting
				Promotion	R.1.6	Develop materials to educate HOAs on right to install rooftop solar on condos as per state statute: https://legislature.vermont.gov/statutes/section/24/061/02291a	Supporting
Natural Areas	N.1: Ensure land is managed to be adaptive and resilient to climate change impacts	Preservation of remaining natural resource areas and increase in green infrastructure and soil health for carbon sequestration, wildlife and insect habitat, flood resiliency and water filtration services	Acres of conserved land and green infrastructure added	Policy	N.1.1	Revise South Burlington's land development regulations to protect our remaining meadows, forests, grasslands and farmlands from further encroachment, as permitted by law. The City should purchase for conservation, and encourage private landowners to conserve or purchase for conservation, South Burlington's meadows, forests, grasslands, farmlands and natural resource areas that then remain unprotected.	Supporting
					N.1.2	Adopt goal to replace 30% of mowed turf with native plant species by 2030. Start a campaign to encourage "climate friendly lawns" whereby residents are encouraged to convert portions with native perennials and trees. (Partner with Grow Wild Burlington and other organizations as appropriate)	Supporting
				Promotion	N.1.3	Increase Soil Health: Promote composting and use of compost to restore soil fertility, microbial activity, and moisture-holding capacity. Promote a voluntary ban on pesticides, herbicides, and non-organic fertilizers.	Supporting
					N.1.4	Retain and Increase Tree Canopy: Enlist City partnerships (community groups) to provide education and outreach to provide technical assistance and opportunities to increase native trees - that can adapt to new temperatures - on public and private property.	Supporting
				Strategic Investment	N.1.5	Retain and Increase Tree Canopy: Develop a program that supports the planting of native trees on private property, commit funding to establish the program and support ongoing implementation.	Supporting
					N.1.6	Increase open space funds to conserve open space and agricultural lands	Supporting

Renewable Energy, Natural Areas, Adaptation, City Gov Ops, Agriculture Actions

Sector	Pathway	2030 Science Based Target	Monitoring Metric	Action Category	ID	Draft Action	High Impact or Supporting
					N.1.7	Consider joining Cities with Nature to collaborate with other urban areas on reconnecting communities with nature: citieswithnature.org	Supporting
Non-Energy Sector (Waste)	NE.1: Reduce solid waste	By 2030, X% decrease in solid waste	Monitor solid waste tonnage	Policy	NE.1.1	As a member of the Chittenden Solid Waste District, reduce municipal and construction waste. Limit trash pickup to only every other week.	Supporting
Govt Operations	GO.1: Develop green practices in City Operations <small>GO.1: Develop green practices in City Operations GO.1: Develop green practices in City Operations GO.1: Develop green practices in City Operations</small>	By 2030, all City operations following green practices	Green practices enacted	Policy	GO.1.1	Adopt a green investment policy	Supporting
					GO.1.2	Adopt a green purchasing policy, including services purchased	Supporting
					GO.1.3	Adopt a green operations policy (includes things like no idling, raise the blade, composting, etc.)	Supporting
					GO.1.4	As management plans are developed, include climate resiliency	Supporting
	GO.2: Electrify City equipment and facilities or increase	By 2030, all City equipment and facilities electrified or substantially more efficient	Fossil fuel use data, and actions that have advanced efficiency	Strategic Investment	GO.2.1	Install solar and micro hydro turbine at wastewater treatment plant	Supporting
					GO.2.2	Include operational efficiency among top priorities for periodic upgrades to wastewater treatment facilities alongside achieving or exceeding environmental thresholds	Supporting
					GO.2.3	Determine strategy and budget for municipal vehicles and equipment to electrify or become zero emission. Consider having VTCCC conduct a free fleet analysis and conduct an annual accounting of fossil fuel data for municipal fleet vehicles . Publicize results as an example of clean investment potential. City to look at options for financing as well as grants to speed adoption. Engage the school district in this effort.	Supporting
					GO.2.4	Budget for annual EV charging equipment installments at various City departments. During renovation or construction, make sites EV-ready.	Supporting
					GO.2.5	Replace gas-powered small engine equipment with electric models.	Supporting
					GO.2.6	Complete replacement of all streetlights with the most energy efficient light sources.	Supporting
					GO.2.7	Develop a plan to electrify and increase the energy efficiency of all municipal buildings. Utilize grants and the City's revolving loan fund for upgrades.	Supporting
GO.2.8					Increase renewable energy production and battery storage portfolio of municipal buildings.	Supporting	
			Promotion	GO.2.9	Instill climate action and resiliency into all City-sponsored activities, events, and programs	Supporting	
	GO.3: Reduce City Employee VMT	By 2030, X% reduction in employee Vehicle Miles Traveled (VMT)	% reduction in employee VMT	Policy	GO.3.1	Develop a program to support employee transit, walking and bike, ride sharing, and work-from-home and encourage online attendance at all meetings. Consider becoming a member of CATMA.	Supporting
Small Engines	SE.1: Electrify Small Engine Equipment	By 2030, all small engines electrified		Policy	SE.1.1	Curtail or ban the use of new two stroke and four stroke gas powered small engine equipment including lawn mowers and weedwhackers. Ban use of leaf blowers. Incentives are available from Vermont utilities for the purchase of residential and commercial battery-electric garden and landscape equipment.	Supporting

Renewable Energy, Natural Areas, Adaptation, City Gov Ops, Agriculture Actions

Sector	Pathway	2030 Science Based Target	Monitoring Metric	Action Category	ID	Draft Action	High Impact or Supporting	
Adaptation and Resilience	AR.1: Follow Recommendations in the All Hazard Mitigation Plan when complete https://www.ccrpcvt.org/our-work/emergency-management/hazard-mitigation-plan	Reduce risks from: Extreme Heat; Extreme Precipitation; High Winds; Drought (in order of vulnerability based on tool below) and depleted agricultural soils https://crt-climate-explorer.nemac.org/	Number of issues in Hazard Mitigation Plan Addressed	Policy	AR.1.1	Increase protection of rivers and streams by increasing buffers around them and by prohibiting human encroachment according to the best science. Both measures will improve resiliency and mitigate damage from flood events.	Supporting	
					AR.1.2	Implement green infrastructure principles into the built environment to better absorb additional annual rainfall, minimize potential flooding events, and prepare for extreme heat and high winds. Encourage rain gardens.	Supporting	
					AR.1.3	Increase wetland buffers according to the best science. This will improve resiliency and enhance wetlands flood absorption capacity.	Supporting	
					AR.1.4	Develop enhanced flood response plans among emergency management personnel, public works, and regional/state partners.	Supporting	
					AR.1.5	Ensure resilient stormwater infrastructure. Assess culverts for geomorphic capacity and aquatic organism passage.	Supporting	
				Promotion	AR.1.6	Encourage weather-based irrigation controllers, smart meters or other water-saving land-scaping technologies. Encourage use of native, salt and drought tolerant grasses, plants, and trees	Supporting	
					AR.1.7	Prepare the public with information on what to do and where to go in extreme heat weather events.	Supporting	
					AR.1.8	Promote cool roofs and pavement and reduction of pavement area	Supporting	
				Strategic Investment	AR.1.9	Invest in green public spaces to make City safer amid worsening heat waves and intensified flooding while also pulling carbon out of the air. Prioritize projects in neighborhoods with disproportionately low access. Increase opportunities for hiking, bird-watching, exercise, etc. in public spaces.	Supporting	
Agriculture/Food Systems	AF.1: Ensure sustainability of local food and farm systems while decreasing emissions	Target TBD	Number of community gardens and increased access to locally grown foods	Policy	AF.1.1	Launch a Nature Based Solutions Program that includes food systems, farms, and expanded community gardens and urban farming prioritizing neighborhoods with disproportionately low access. Require regenerative, no-dig practices in City managed community gardens. Encourage regenerative, no-dig practices in residential gardens. Parks and Recreation Dept shall offer gardening classes and resources such as lower cost access to materials to construct raised beds, soil/compost, gardening implements and seeds as a summer course option for adults and separately for children. This can be done in neighborhoods where raised beds can be added on commonly owned land, or in landscaped areas of multifamily buildings. Utilize recommendations from the South Burlington Sustainable Agriculture/Food Security Action Plan.	Supporting	
					Promotion	AF.1.2	Work with UVM Extension and organizations like Common Roots-Farm to Fork programs to promote food education in schools and sustainable agricultural practices that support local farms and reduce reliance on large, out of state food producers and their associated VMT. www.commonroots.org	Supporting
						AF.1.3	Encourage food retailers to carry local products.	Supporting

Renewable Energy, Natural Areas, Adaptation, City Gov Ops, Agriculture Actions

Sector	Pathway	2030 Science Based Target	Monitoring Metric	Action Category	ID	Draft Action	High Impact or Supporting
					AF.1.4	Promote "Vitality gardens" as a way to bring healthy seniors and younger people together around the community to grow local produce for home consumption.	Supporting