

A. Energy

South Burlington's climate – and global climate – has changed due to Greenhouse Gas (GHG) emissions. Dependence on fossil fuels is responsible for almost all South Burlington's emissions. Known effects have been documented and more are predicted in the future.

South Burlington has an opportunity to reduce its climate pollution from building heating and transportation by transitioning to carbon-free energy sources, such as electricity from Green Mountain Power's 100% carbon-free mix, and by making it easier to walk, bike, or take transit through changes in development patterns and transportation infrastructure. It also has an opportunity to increase renewable energy generation in South Burlington to support the shift to electrified heating and transportation.

In 2021, the City Council formed a Climate Action Plan Task Force (CAPTF) to work in concert with staff and selected consultants 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).

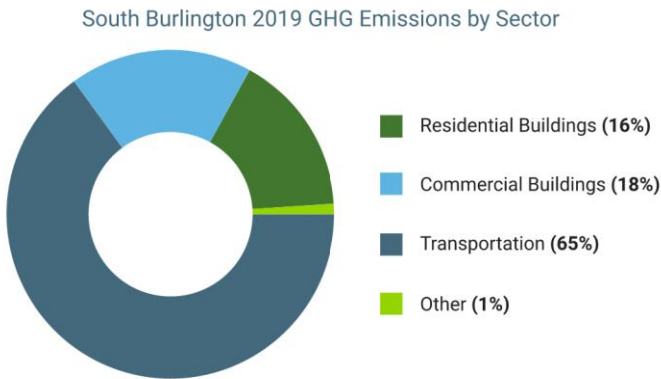
In 2022, the City Council adopted its first-ever Climate Action Plan (CAP), laying out a strategy to meet these climate goals and the goals of Vermont Act 174, Enhanced Energy Plans. The 2022 CAP's targets are incorporated as objectives of this Comprehensive Plan, and the CAP itself is interwoven throughout this Plan.

OBJECTIVES

- 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, and construct carbon-free new homes and businesses
- 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 acres) new housing development to reduce emissions by 4%
- Increase new renewable energy generation to between 30,794 to 55,549 Megawatt hours (MWh) by 2030 and 63,297 to 121,060 MWh by 2050.
- Municipal Operations follow green practices to meet or exceed our proportional share of citywide greenhouse gas emissions targets and provide community demonstration projects
- Meet or exceed South Burlington's renewable energy generation targets identified through Act 174 or its successors.

INVENTORY, ANALYSIS, & CHALLENGES

To meet the City’s climate goals, the community needs to reduce emissions by 60% by 2030 and by 95% by 2050. The overwhelming majority of emissions attributable to South Burlington come from two sectors: Transportation/Land Use (65%) and Buildings / Thermal (34%, split between residential and commercial). Other contributors, including small engines, solid waste, agriculture, and the offsetting effects of natural resources also present complementary opportunities. Meeting the overall reduction goals will require significant investment, education, and regulatory changes in both our transportation and buildings.



Source: South Burlington Climate Action Plan, 2022

Transportation Sector

Reduction in emissions generated by transportation includes both the miles travelled (VMT) and the electrification of vehicles. South Burlington’s location dictates that it will continue to be a transportation hub in Vermont at the intersections of major roadways and as home of the region’s primary airport. The City is working, both internally and with regional partners, to reduce VMT and reduce single-occupancy commuter traffic.

To reduce overall vehicle miles travelled in our community, especially at the scale targeted in the CAP, the City will need to reorient its transportation network from passenger cars to walking, biking, and using public transportation. The physical design of the transportation network itself will also need to be shifted. As discussed in the Transportation Chapter, much of South Burlington’s existing network is designed first for cars, and second (where available) for people on foot, on bicycle, or using transit. The growing popularity of e-bikes presents an opportunity to meet the City’s targets and also exposes some of these infrastructure gaps. Examples of these gaps include four-lane roads with limited crossings, wide vehicle lanes, narrow greenbelts, a disconnected recreation path and sidewalk network, limited pedestrian lighting, and intersections that are designed with wide turn radii and/or slip lanes. The City has taken important steps to begin this retrofit in recent years, including adopting updated cross-sections for new roadway construction, passing a Penny-for-Paths ballot initiative to improve connections, establishing a dedicated path maintenance fund in the City budget, increasing funding for lane striping, and investing in staffing to pursue capital projects throughout the City.

The City also needs to prioritize a land use pattern that provides homes, services, employment, parks, and other destinations within short distances of one another. The development of pedestrian and bicycle paths, greenways and other trails, changes in regulations that enable commercial services near or within neighborhoods, and investment in neighborhood-scale parks and facilities provide climate-resilient ways of building community.

The City's sustained commitment to creating a compact, multi-use, pedestrian-focused City Center is a strong example of the future of transportation and sustainable-transportation-driven land use. Public and private investments have begun to transform this core area by developing multi-family housing and pedestrian/human-scale commercial use. The pairing of higher density residential living and human-oriented commercial space, alongside municipal services at City Hall, creates a community hub that will over time become much less auto-dependent and community-focused. See the Land Use chapter for analysis and specific policies for advancing the City Center vision further, as well as land use goals throughout the City.

In addition to land use and infrastructure changes, personal vehicles must be changed over to electric. South Burlington faces complex challenges in promoting and expanding access to electric vehicles due to our housing mix and housing affordability. Access to overnight charging is required for a personal electric vehicle to be practical. Over 50% of homes in South Burlington are in multi-family housing and nearly 40% of households rent their homes. In both cases, it is far less likely that a resident will have direct access to EV charging and control over the installation of EV charging than a resident of a single-family, owner-occupied home. For EV access to be equitable, South Burlington must take steps to encourage, promote, or require EV charging at multi-family buildings and for renters.

See the Transportation Chapter for analyses and specific policies for transforming the transportation network to meet these objectives.

Buildings and Thermal

Reduction in emissions generated by buildings involves both changes to new construction and updates or retrofits for existing buildings.

For new buildings, the City took an initial step in 2021 and 2022 by establishing regulatory standards for the orientation of streets and buildings for solar gain and requiring that new buildings meet the State's Stretch Energy Codes. In November 2022, the City adopted an ordinance that requires carbon-free / renewable fuel sourcing for primary heating system and hot water systems in all new buildings. This action will limit increases in carbon emissions from the buildings sector while complementary action on existing buildings are intended to reduce existing annual carbon emissions in order to meet the targets identified in the Plan.

For existing buildings, the CAP includes targets for both weatherization (including insulation, air sealing, efficient windows and doors, etc.) and for electrification of a building's primary heating system. Weatherization of 600 homes per year will result in 4,200 homes (or more) being weatherized in 7 years, which is nearly 45% of South Burlington's existing housing stock. Electrification of 360 existing homes per year will result in more than half of the homes being electrified within 15 years.

Weatherization, electrification of existing homes, and construction of new homes with electric-based heating systems can have significant costs for homeowners. The City and its partners will need to support homeowners in making these changes in order to assure an equitable, and successful, implementation.

Local utilities (Vermont Gas Systems and Green Mountain Power) and the state-level Efficiency Vermont have programs and resources to help customers reduce their monthly electric bills, including information about rebates and tax incentives available for energy-saving purchases. These programs are available for both income-eligible households and for all households, depending on the program. Regionally, Champlain Valley Office of Economic Opportunity also provides support for weatherization and heating assistance. In order to meet local and state Climate targets, however, the implementation of these programs will need to be increased significantly requiring financial support, staffing, and outreach.

The Climate Action Plan further identifies that a combination of incentives and regulatory tools will be necessary to meet Climate targets. These approaches are detailed as High Impact and Supporting Actions within the Climate Action Plan. Neither approach on its own will likely achieve the magnitude of conversion and electrification enumerated in the CAP. Private-public partnerships will also have to play a significant role in meeting the CAP goals. An example of this kind of partnership is being implemented in the Chamberlin Neighborhood. There, a program funded by the Federal Aviation Authority to mitigate Airport noise through sound insulation of nearby homes and gathering places is being paired with investments from Vermont Gas Systems and other partners to achieve thermal insulation and extend the annual reach of the program.

Energy Use by City Government. The City's primary energy use consists of electricity, natural gas and motor fuel. The Climate Action Plan identified that in 2019, the Department of Public Works emitted 65% of the City government's total GHG emissions, 74% of which goes to direct operations of the wastewater treatment plants. The Police Department emitted 17% of the total City government GHG emissions, and the Fire Department emitted 12%.

The CAP laid out a broad approach for City Operations to meet our share of the citywide targets. This is being further developed through an Implementation Plan in 2023 and is being integrated into the City's Operations Budget and Capital Improvement Plan. Over time, the City plans to replace gas-powered and fossil-fuel powered vehicles, small engines, and building systems with more efficient and/or electrified options. The City has significant numbers of fleet vehicles that can be replaced with EVs over time, building heating and cooling that can be made more efficient and/or electrified, and smaller facilities and equipment that can be replaced with electric options. As these facilities, vehicles, and equipment need to be renovated or replaced, the City will need to budget for electrified replacements as they come up.

Energy Production. This Plan is intended to double as an Enhanced Energy Plan under Vermont Act 174; as part of that, and as part of the City's overall goal of reducing greenhouse gas emissions, this Plan

provides pathways to meet identified targets established by the Regional Planning Commission for renewable Energy production in the City.

Demand for electricity is growing and electric system reliability will continue to be improved as we move forward with the goals of the Climate Action Plan, and as our neighboring municipalities pursue their own climate change mitigation plans. Two transmission line projects have upgraded the infrastructure serving Chittenden County located South Burlington: the Northwest Reliability Project included upgrading high voltage transmission lines and updating a number of substations; the East Avenue Loop and supporting projects installed a 34.5 kilovolt (kV) sub-transmission line was installed from the McNeil generating plant to the VELCO substation at East Avenue and replaced two 115 kV transmission lines with single line. Additional upgrades to the electrical grid will be necessary in the coming years and decades.

Increasing solar energy generation is an opportunity for South Burlington to generate more clean energy locally. Generation of power close to where it is used reduces loss during transmission and stresses the regional power grid less. South Burlington has taken significant steps forward in recent decades, but we must do more to meet our climate goals. In 2011, the largest solar array in Vermont (at the time) opened in the City, with an estimated output nearing two megawatts annually, followed by several other large solar facilities, medium facilities, and numerous small installations. As of 2022, renewable energy generation in South Burlington was 22,544 MWh. Solar-ready rooftops are now required on certain new buildings. To meet the goals in the CAP, the amount of renewable energy generation will need to increase by 300% to 600% by 2050 (63,297 to 121,060 MWh). Significant investment, incentivization, and regulation that promotes solar energy generation will be needed to meet those goals.

Small-scale wind energy in South Burlington is limited by the high density of development and unfavorable climatic conditions.

This Plan recognizes that land in South Burlington is valuable, important and faces multiple demands: natural resource conservation, housing, employment, services, education, transportation, agriculture, parks, and renewable energy production. As in the Climate Action Plan, this Plan prioritizes the co-location of renewable energy production with other uses. The City needs to focus on rooftop solar, solar-over-parking, and creative opportunities such a solar over landfill, integrated with transportation systems, and integrated with agriculture.

There are no conventional power plants located in South Burlington.

Outreach and Implementation

Community members, stakeholders, and City staff emphasized the challenges of implementing large scale physical and behavioral changes throughout the development of the Climate Action Plan and during the Community Conversation on Energy & Climate for this Plan. For households, expertise, investment, and follow-through on weatherizing and electrifying have historically been significant obstacles. Community feedback pointed to a suite of tools – including regulations and enforcement, incentives, and neighbor-to-neighbor education and motivation – as keys to success. At the community scale, active community participation in decision-making will be critical. This includes decisions on all

topics, including how to invest in vehicle charging systems, how to transform land use, and how to update our transportation to acknowledge the necessity of cars for some trips and users while prioritizing walking, biking, and transit in infrastructure enhancements.

Importantly, this work must be implemented in an equitable manner. Pursuing equity will involve listening to the needs of the community, designing programs to facilitate transportation and home improvements for all users, and accounting for the uneven costs of climate change.