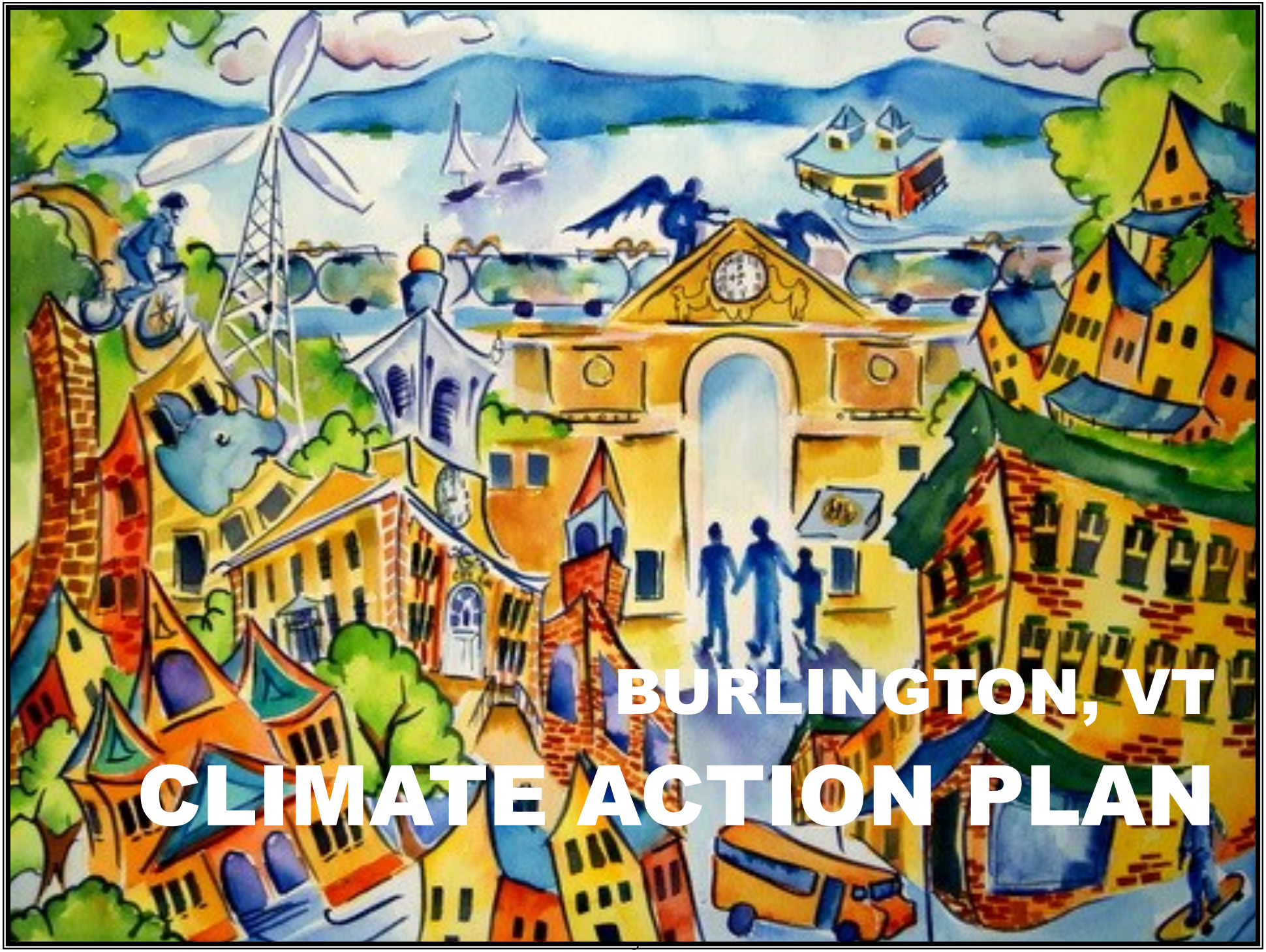

BURLINGTON, VT

CLIMATE ACTION PLAN

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What is a Climate Action Plan?

A climate action plan is a detailed and strategic framework for measuring, planning, and reducing Green House Gas (GHG) emissions and related climatic impacts. Municipalities design and utilize climate action plans as customized roadmaps for making informed decisions and understanding where and how to achieve the largest and most cost-effective emissions reductions that are in alignment with other municipal goals. Climate action plans, at a minimum, include an inventory of existing emissions, reduction goals or targets, and analyzed and prioritized reduction actions. Ideally, a climate action plan also includes an implementation strategy that identifies required resources and funding mechanisms.

What is this plan about?

This document provides an overview of Burlington's Climate Action Plan - how it was created, why it is necessary, and what are its goals. Supporting research, documentation, and steps that city officials, individuals, and organizations can take to implement change are available at www.burlingtonvt.gov/cap/.

Burlington

Leading the Way

1996
Burlington becomes one of the first cities to join the "Cities for Climate Protection" campaign organized by ICLEI.

1998
City Council passed a resolution setting a 2005 reduction target of 10% below 1990 levels.

Mayor Clavelle forms the first Climate Protection Task Force.

2000
Burlington's first Climate Action Plan is adopted by City Council in May.

2008
The City begins the update of its Climate Action Plan with the preparation of a new Greenhouse Gas Inventory.

Over 100 citizen participate in the generation of 200+ mitigation strategies.

2009
The City prepares a cost-carbon benefit analysis of 17 proposed mitigation actions.

2010
The City creates a greenhouse gas emission tracking tool to easily allow City government to regularly track and record emission data .

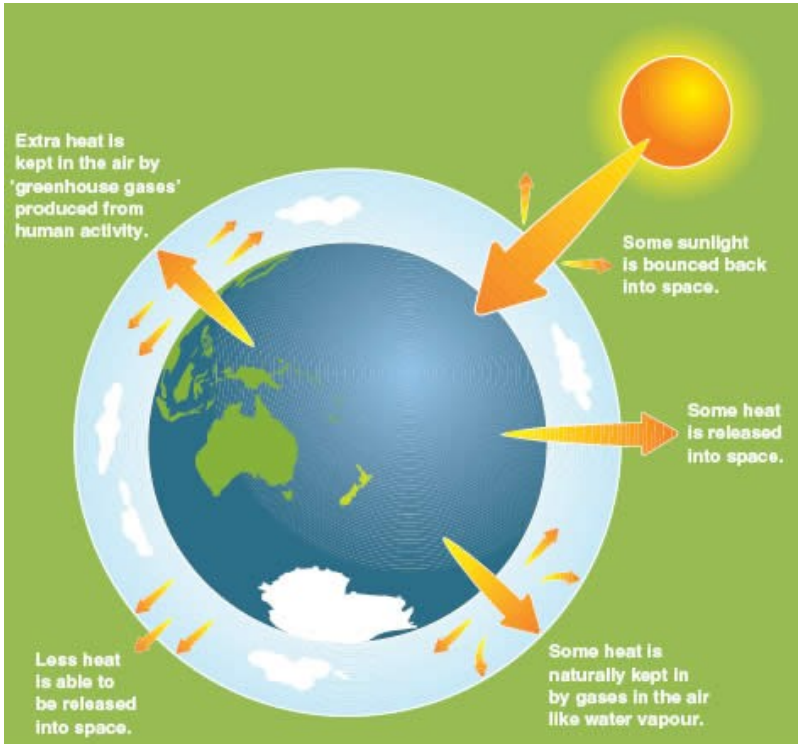
2016
The City will have stabilized its greenhouse gas emissions with the use of strategies presented in this plan.

2025
The City will have reduced its greenhouse gas emissions by the first target identified on page 10.

Why we care?

What is climate change ?

The greenhouse effect is the process by which the atmosphere traps some of the sun's energy, warming the Earth and moderating our climate. A human-driven increase in 'greenhouse gases' has enhanced this effect artificially. These greenhouse gases include carbon dioxide, produced by burning fossil fuels and through deforestation, methane, released from agriculture, animals and landfill sites, and nitrous oxide, resulting from agricultural production plus a variety of industrial chemicals.

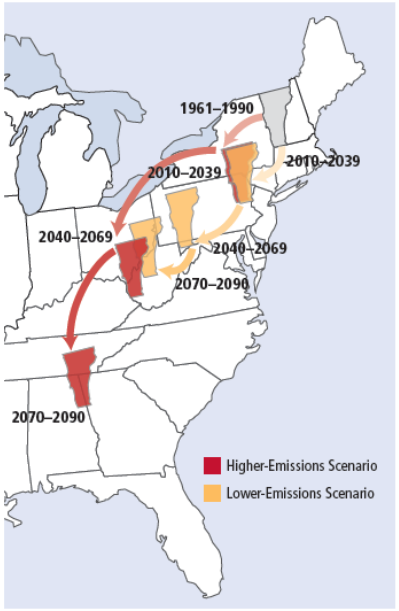


Vermont's Changing Climate

From the Lake Champlain shore to the Connecticut River Valley, the climate of Vermont is changing. Records show that spring is arriving earlier, summers are growing hotter, and winters are becoming warmer and less snowy. These changes are consistent with global warming, an increasingly urgent phenomenon driven by heat-trapping emissions from human activities.

New state-of-the-art research shows that if global warming emissions continue to grow unabated, Vermont can expect dramatic changes in climate over the course of this century, with substantial impacts on vital aspects of the state's economy and character. If the rate of emissions is lowered, however, projections show that many of the changes will be far less dramatic. Emissions choices we make today—in Vermont, the Northeast, and worldwide—will help determine the climate our children and grandchildren inherit, and shape the consequences for their economy, environment, and quality of life.

Temperature. Average temperatures across the Northeast have risen more than 1.5 degrees Fahrenheit (°F) since 1970, with winters warming most rapidly—4°F between 1970 and 2000. If higher emissions prevail, seasonal average temperatures across Vermont are projected to rise 9°F to 13°F above historic levels in winter and 7°F to 14°F in summer by late-century, while lower emissions would cause roughly half this warming.



Migrating State Climate

Changes in average summer heat index—a measure of how hot it actually feels, given temperature and humidity—could strongly affect quality of life in the future for residents of Vermont. Red arrows track what summers in Vermont could feel like over the course of the century under the higher-emissions scenario. Yellow arrows track what summers in the state could feel like under the lower-emissions scenario.

Precipitation and winter snow. The Northeast region is projected to see an increase in winter precipitation on the order of 20 to 30 percent. Slightly greater increases are projected under the higher-emissions scenario, which would also feature less winter precipitation falling as snow and more as rain.
Heavy, damaging rainfall events have already increased measurably across the Northeast in recent decades. Intense rains struck the region in 2011 during Irene, for example, causing widespread flooding. The frequency and severity of heavy rainfall events is expected to rise further under either emissions scenario.

Drought. In this historically water-rich state, rising summer temperatures coupled with little change in summer rainfall are projected to increase the frequency of short-term (one- to three month) droughts, particularly if higher emissions prevail. By late-century, for example, short-term droughts are projected to occur annually under the higher emissions scenario (compared with once every two years, on average, historically), increasing stress on both natural and managed ecosystems.

Impacts of Climate Change on Vermont and Burlington

IMPACTS ON WINTER RECREATION

Snow and cold temperatures mean big business for the Green Mountain State. Ski areas provide recreation for residents and visitors along with thousands of jobs, and contribute more than $1.1 billion a year to the state's economy. Winters are already changing, and may look and feel profoundly different over the course of the century.

Snowmobiling. Vermont is part of a six state network of snowmobile trails totaling 40,500 miles and contributing $3 billion a year to the regional economy. Snowmobiling relies almost entirely on natural snowfall. Projected losses in natural snow cover and the impracticality of snowmaking on this vast system mean that the snowmobiling season could decline dramatically by late-century.

Skiing. Milder winters are expected to shorten the ski season, and the state's ski areas may no longer be viable by late-century.

Lake ice. Ice fishing and pond hockey are winter favorites in Vermont. However, global warming will render lake ice cover increasingly thin and shorten its duration. Ice cover duration on Lake Champlain has already declined in recent decades.

IMPACTS ON FORESTS AND AGRICULTURE

Forests cover nearly 80 percent of the Vermont landscape. The state's forest-related manufacturing, recreation, and tourism sectors contribute more than $1.4 billion to the state's economy and provide jobs for many residents. These woodlands also provide wildlife habitat, protect watersheds, conserve soil, and store carbon. Climate change has the potential to dramatically alter the character of Vermont's forests.

Agriculture has long been a vital part of Vermont's character and economy. Global warming will present both opportunities and challenges to Vermont's growers. For example, increases in the frequency of short-term drought could necessitate increased irrigation and operational costs, while a longer growing season could benefit those farmers seeking to invest in warmer weather crops that are currently hard to grow.

By late-century, increasing summer temperatures and heat stress could depress the yields of some of Vermont's economically important cool-weather crops. Northward expansion of agricultural pests and weeds are expected to further impede crop production during this time frame, and potentially pressure farmers to increase their herbicide and pesticide use (or, in the case of organic farms, invest more heavily in labor-intensive weed and pest control).

IMPACTS ON HUMAN HEALTH

From more intense summer heat waves to deteriorating air quality, the effects of global warming are expected to increase the risk of a number of health problems.

Extreme heat. While Burlington residents are accustomed to the occasional summer heat wave, the number of hot days is projected to increase substantially in much of the state by late-century, with some areas experiencing temperatures over 90°F on more than half of July days. Very hot days are not only unpleasant but also dangerous, as they increase the risk of heat stress and even death.

Air quality. Higher temperatures and increasing levels of carbon dioxide (CO_2) in the air are also expected to have significant impacts on human health, which could include development or reproductive harm, asthma attacks, lung cancer, wheezing and coughing, shortness of breath, cardiovascular harm, lung tissue redness, swelling, etc.

Vector-borne disease. Mosquitoes and ticks carry West Nile virus (WNV) and Lyme disease-causing bacteria, and spread them to animals and humans. Projections for the Northeast of warmer winters, hotter summers, and more frequent summer dry periods punctuated by heavy rainstorms can set the stage for more frequent WNV outbreaks.

IMPACTS ON INFRASTRUCTURE AND LAND

In the last decades, the frequency and severity of storm events have increased tremendously and in Burlington more specifically we have seen increased flooding. Think of the Lake Champlain flooding and Irene in 2011, and Hurricane Sandy in 2012. Such flood events equate to ***higher levels of stormwater*** and have a direct impact on our water infrastructure in the City. During major storm events the waterfront wastewater treatment plant cannot always handle the increased flow in areas of the city where the wastewater and stormwater systems are combined. This means that untreated wastewater is sent directly to the Lake. Given the age of our infrastructure, these major storm events threaten their integrity and we should expect to see more unanticipated breaks, wash-outs and flooding.

Bank erosion is another impact of more severe flooding. Damage that the Burlington bike path and many lakeshore properties quickly come to mind when remembering the 2011 events. The cost to repair and/or replace eroded banks create an additional burden on individuals, city finances and the cost often has to ultimately be paid for by citizens.

Limited recreation opportunities from decreased water quality or physical constraints due to flooding have also been more frequent, i.e.: beach closures, prohibited swimming and/or boating, limited bike path use, etc.

Climate Change and Equity

Equity and inclusion are a high priority for the City of Burlington. To respond to the complex and intertwined issues of climate change and social equity. the City must put forth a clear and unyielding effort to promote inclusion in all decision and policy-making processes, while at the same time applying an equity lens to implementation strategies in order to create an integrated response that goes far beyond reducing carbon emissions. Addressing social equity will, in turn, help foster strong, resilient natural systems and neighborhoods. Some areas for consideration include:

- How can the City of Burlington build a more diverse and multi-disciplinary climate action stakeholder group?
- By evaluating emissions mitigation strategies with attention to issues of equity, how might planning and implementation of infrastructure and behavioral emissions reduction projects be enhanced?
- In what ways does a more inclusive set of active stakeholders create a more effective and innovative emissions reduction program?
- What are the synergies between equity and inclusion goals and climate action goals and how do these crossovers advance a community culture of sustainability?
- How can the City of Burlington help ensure the safety and health of all of its citizens in the face of a changing climate?

The City of Burlington has identified five key areas, which present pressing equity issues either presently or in the future. These issues will be explored in the future to create a more comprehensive and transparent plan of action.

Housing

- Disparate concentrations of wealth in relation to floodplains and green space
- Individuals' financial ability to adapt and respond to climatic changes
- Access to energy efficient homes – including heating, cooling, and weatherization

Infrastructure and Transportation

- Individuals' proximity to affordable, reliable public transportation
- Distance from town center and shopping centers proportional to levels of income and wealth

Extreme Weather Events and Impacts

- Flooding and tree falls
- Effects of extreme weather on livability, comfort, and crime

Food Security

- Stability and viability of long-term, local agriculture
- Access to and affordability of fresh, local foods
- Community garden placement and supporting resources
- Home garden and composting education

Participation, outreach, and education

- Equitable community involvement in policy and decision making process such as zoning and land use planning
- Build on the work of the diverse stakeholders through a climate action education designed to engage and inform all members of the community

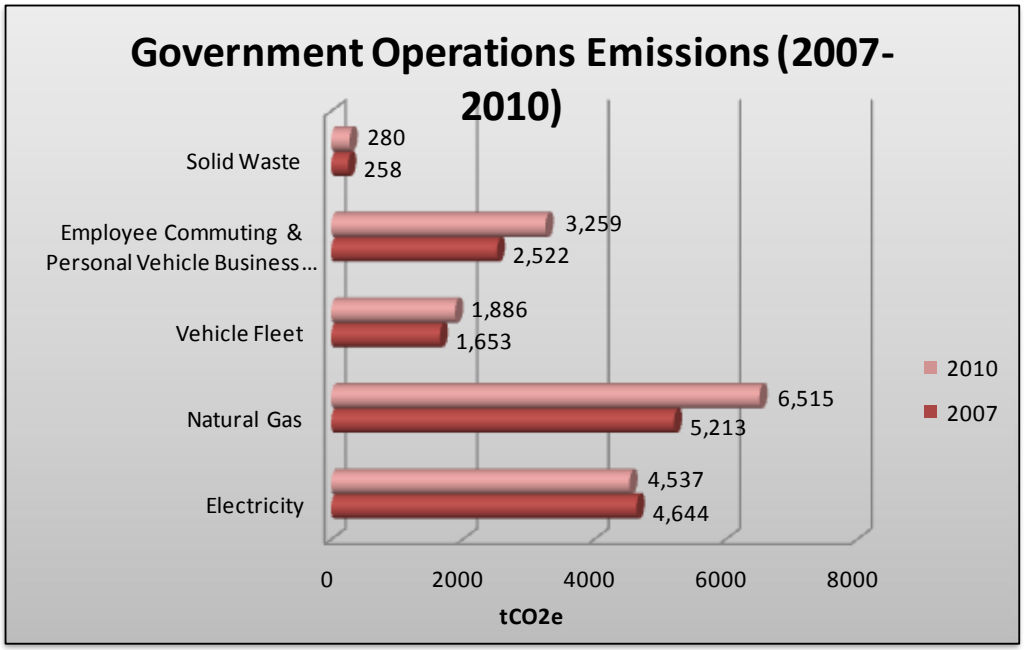
The City of Burlington, through its climate mitigation and adaption efforts, has already begun developing a comprehensive, integrated plan of action to respond to and deal with the issues of climate change and equity.

Where Are We Now with Government Operations Emissions?

Snapshot in time

While based on extensive research and analysis, the Burlington Climate Action Plan represents a snapshot in time using the best information available today. The greenhouse gas emissions inventory results depicted below and in the next few pages are always changing. The 2007 and 2010 inventories were prepared using the International Local Government Greenhouse Gas (GHG) Emissions Analysis Protocol developed by the Climate Registry and ICLEI. It is our hope to update this information every 3 years to track progress.

The City of Burlington's government operations generated 14,290.7 tCO2e in 2007, increasing by 15% to 16,476.9 in 2012. This translates to an increase in cost from $4.5 million in 2007 to approximately $4.9 million in 2010 (a 7% rise).



While electricity usage and emissions have decreased between 2007 and 2010, every other generation source has increased, with employee commute being highest (a 29% increase).

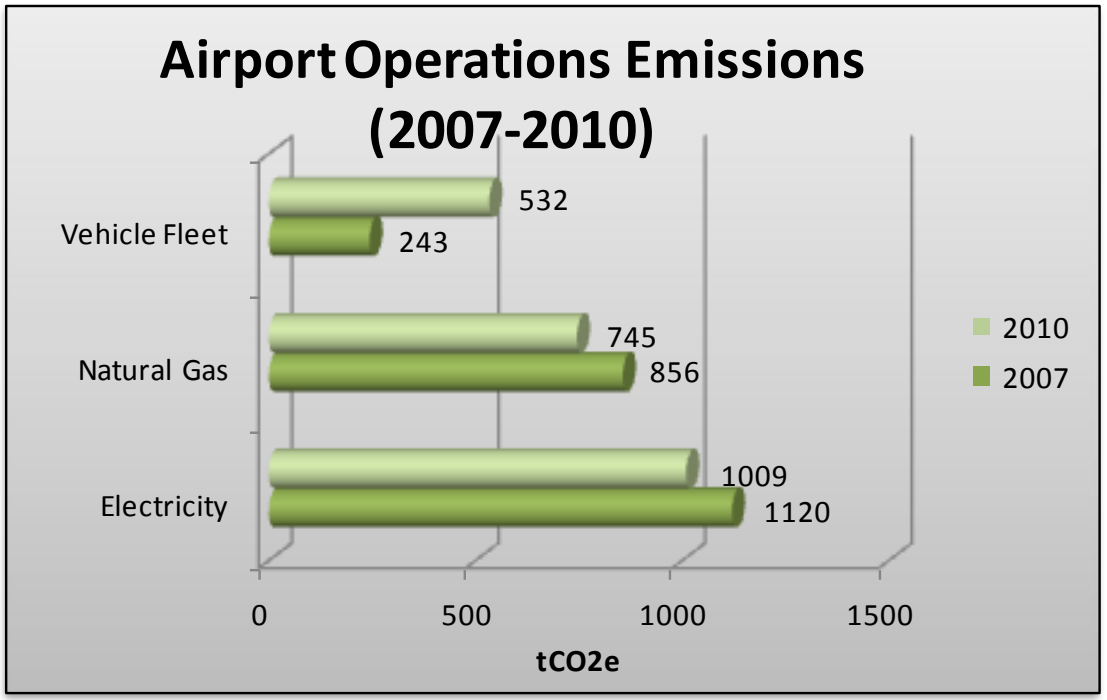
- In 2007, the City Government consumed around 21 million kWh of electricity, emitting 4,643.8 tCO_2e. This decreased by 2% in 2010 to around 20 million kWh and 4,537.2 tCO_2e.
- In 2007, the City Government consumed over 965,000 CCFs of natural gas, emitting 5,213.4 tCO_2e. This increased by 25% in 2010 to over 1.2 million CCFs and 6,514.8 tCO_2e.
- The City Government's vehicle fleet consumed around 184,000 gallons of diesel, biodiesel, and gasoline (23,957.1 MBTU) in 2007, emitting 1,653.3 tCO_2e, which increased by 14% in 2010 when over 210,000 gallons (27,323.2 MBTU) were consumed and 1,885.9 tCO_2e were generated.
- With over 5.9 million miles driven for commuting purposes in 2007 and over 420,000 miles driven in personal vehicles for business travel, employee commuting & personal vehicle business travel emitted 2,521.9 tCO_2e. The average commute distance was 11 miles (one way) in 2007 and 78% of employees drove alone to work. In 2010, nearly 8.0 million miles were driven for commuting purposes and around 330,000 miles were driven in personal vehicles for business travel. Employee commuting & personal vehicle business travel generated 3,259.0 tCO_2e, a 29% increase from 2007. The average commute distance rose to nearly 13 miles (one way) in 2010, and 75% of employees drove alone to work.
- The City Government disposed over 1,600 tons of land filled waste in 2007, which generated 258.2 tCO_2e. This increased to nearly 1,750 tons of land filled waste in 2010 and 280.0 tCO_2e.

These results show that by improving the energy efficiency of city-owned buildings and encouraging city workers to use alternative ways of commuting to work, the city can have a strong impact on reducing annual GHG emissions. These types of initiatives would also have a direct impact on costs/savings both for the City and its staff.

Where Are We Now with the Airport's Emissions?

The City of Burlington's Airport generated 2,219.4 tCO_2e in 2007, increasing by 3% to and 2,287.2 tCO_2e in 2010. This translates to a cost of $963,300 in 2007, decreasing by 2% to $947,339 in 2010. For more information on data, inputs and assumptions, please see appendices A and B.

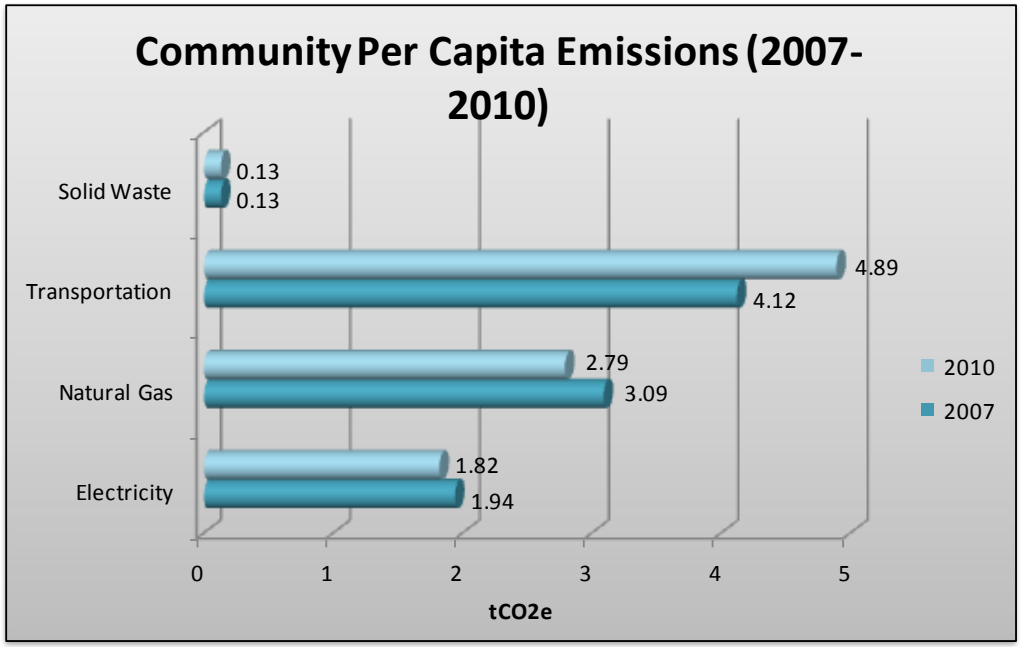
- In 2007, the Airport consumed over 5.1 million kWh of electricity, emitting 1120.1 tCO_2e. This decreased by 10% in 2010 to around 4.6 million kWh and 1,009.2 tCO_2e.
- In 2007, the Airport consumed nearly 160,000 CCFs of natural gas, emitting 856.1 tCO_2e. This decreased by 13% in 2010 to around 138,000 CCFs and 745.1 tCO_2e.
- The Airport's vehicle fleet consumed around 25,000 gallons of diesel, biodiesel, and gasoline (3,493.3 MBTU) in 2007, emitting 249.2 tCO_2e. In 2010 these figures increased to over 48,000 gallons (6,517.2 MBTU) consumed and 543.5 tCO_2e generated. This presents an increase of 218%.
- The Airport spent over $963,000 in 2007, decreasing by 2% to just over $947,000 in 2010.



Since these numbers were calculated, the airport has undertaken aggressive energy efficiency efforts. Projects include: replacing incandescent taxiway lighting with LEDs; replacing terminal, roadway, and parking lot lighting with CFL and LEDs; replacing parking garage lighting with LEDs; replacing aging air conditioning and heating equipment with high efficiency units; and replacing terminal air handling units with high efficiency units. The airport has also upgraded manual equipment controls to digital.

Where Are We Now with Community Emissions?

As a Community, Burlington generated 380,762.3 tCO_2e in 2007, increasing by 6% to 404,778.6 tCO_2e in 2010. This translates to a cost of over $78.9 million in 2007, decreasing by 4% to $76.0 million in 2010. In order to account for population growth in the future and allow for relative comparison between inventories, a per capita emission analysis is most helpful. The graph to the right presents the community inventory results per capita for both 2007 and 2010. The table below presents the total emissions for the community.



- In 2007, the Community consumed over 360.6 million kWh of electricity, emitting 79,664.2 tCO_2e. This decreased by 4% in 2010 to around 346.2 million kWh and 76,474.4 tCO_2e.
- In 2007, the Community consumed nearly 23.4 million CCFs of natural gas, emitting 126,496.0 tCO_2e. This decreased by 7% in 2010 to nearly 21.7 million CCFs and 117,242.6 tCO_2e.
- With over 259 million vehicle miles traveled (VMT) in 2007, Community transportation emitted 169,102.0 tCO_2e. This increased by 24% in 2010, when 320 million VMT were driven and 205,487.0 tCO_2e were generated. Transportation is the largest source of emissions generated by the Community. In short, emissions increased by almost a quarter since 2007.
- The Community disposed of nearly 34,375 tons of landfilled waste in 2007, generating 5,500.1 tCO_2e. This increased by 1% to 34,841 tons of landfilled waste in 2010 or 5,574.6 tCO_2e.

Of the total Community GHG emissions, 44% was generated by Community transportation in 2007, and 51% in 2010, indicating that a reduction in annual vehicle miles traveled (VMT) in Burlington could have the biggest impact on our emissions reduction target.

Community - 2007 and 2010 Total Emissions

Source	2007 GHG Emissions (tCO_2e)	Percent of Total 2007 City Emissions	2010 GHG Emissions (tCO_2e)	Percent of Total 2010 City Emissions
Electricity	79,664.2	21%	76,474.4	19%
Natural Gas	126,496.0	33%	117,242.6	29%
Transportation	169,102.0	44%	205,487.0	51%
Solid Waste	5,500.1	1%	5,574.6	1%
TOTAL	**380,762.3**	**100%**	**404,778.6**	**100%**

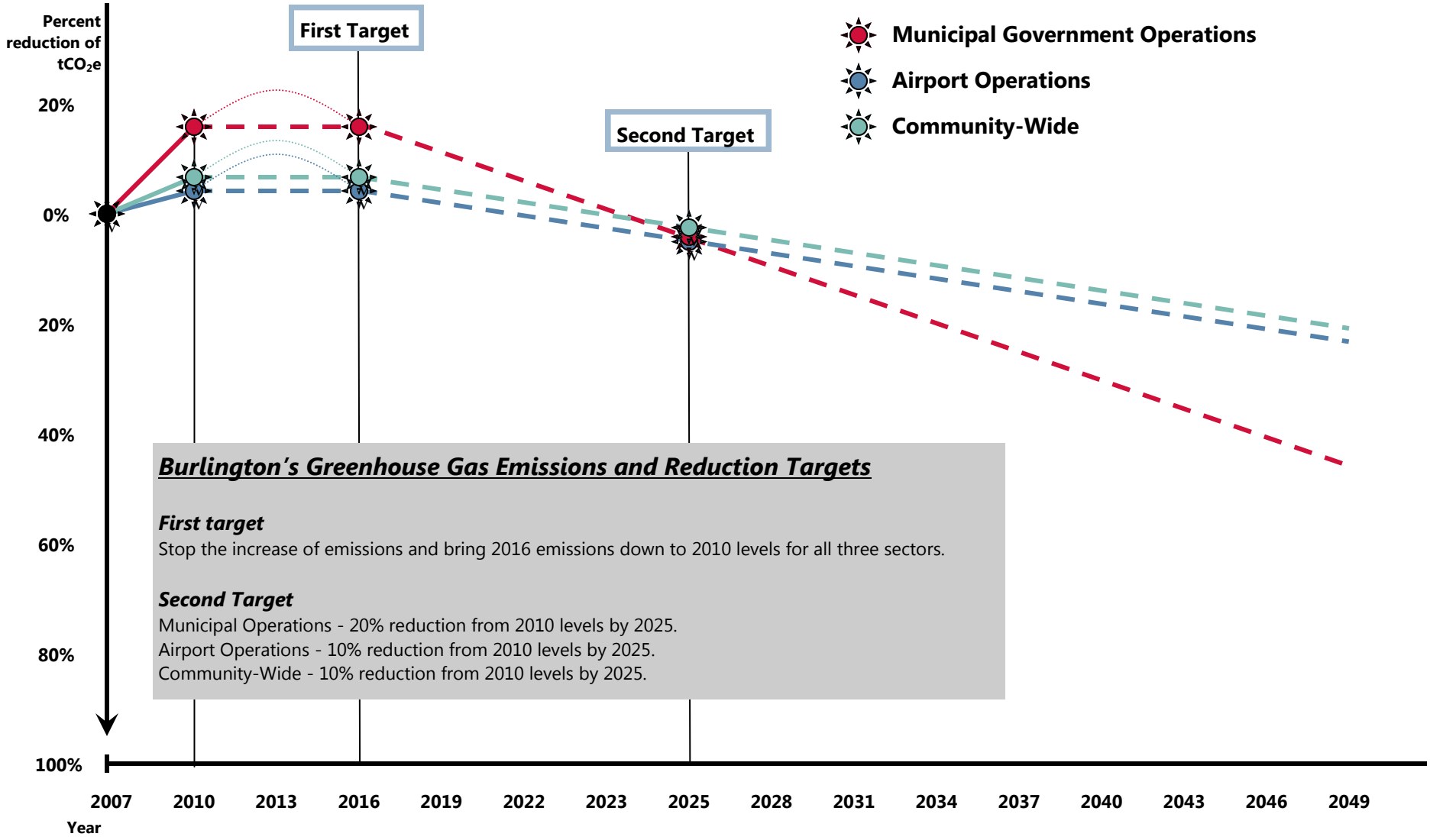
Please note that percentages may not add up to 100% due to rounding.

While energy produced from biomass may not always be carbon neutral, the Climate Protection Protocol (the standard GHG tracking tool used by cities around the world) does not require that GHG from biomass be integrated into overall calculations. That said, should this change and biomass be included in an updated Protocol, Burlington will include this information when it collects future data.

The US Environmental Protection Agency reports that 2012 McNeil's Total Facility CO2e Emissions (excluding Biogenic CO2) were 8425 metric tons and McNeil's measured Biogenic CO2 was 344,501 metric tons.

Where Are We Going?

Now that we have a sense of where our current emissions levels are, it is important to set emission reduction targets that are realistic considering where we have been and considering that emissions have increased between our two inventories. The chart below illustrates specific reduction targets for government operations, airport operations, and the community respectively. The first target requires leveling off the growth of emissions by 2016 and bring them back to 2010 levels. The second target involves an actual reduction of the 2010 emission levels by 2025.



Burlington's Greenhouse Gas Emissions and Reduction Targets

First target

Stop the increase of emissions and bring 2016 emissions down to 2010 levels for all three sectors.

Second Target

Municipal Operations - 20% reduction from 2010 levels by 2025.
Airport Operations - 10% reduction from 2010 levels by 2025.
Community-Wide - 10% reduction from 2010 levels by 2025.

How Can We Reduce Our Emissions?

In the fall of 2008, the city launched a lengthy community process, reflective of Burlington's participatory decision-making and community involvement history. Between September 2008 and February 2009, over 100 community volunteers and City staff gathered in eight working groups to develop emissions mitigation strategies under seven of the following eight themes. This work resulted in over 200 recommendations that were shared and vetted with the public at the December 2008 Legacy Town Meeting.

Each of the top strategies presented in this plan were carefully evaluated and chosen with the following criteria in mind:

- GHG Reduction Effectiveness
- Financial Performance/Cost Effectiveness
- Existing Implementation Capacity
- Available Funding/Financing
- Technical Feasibility
- Public Interest/Support
- Existing Momentum/Champion
- Local/Regional Economic Impact

Through this evaluation, 39 strategies rose to the top and are included in this plan as the first steps to take to reduce our emissions.

Most recently, with the development of planBTV-Downtown & Waterfront and other initiatives, the City added one more theme/goal that is central to reducing our impact on climate change. ***Compact mixed-use development*** considerations have proven to be one of the most effective ways to affect our generated emissions at a community level.

The following pages of the plan present the overarching goals for each themes as well as the related proposed strategies.

Goal: Promote compact mixed-use development.

Strategies

- Promote an active and vibrant downtown and waterfront core
- Promote compact mixed-use development in neighborhood activity centers
- Expand housing choices and grow the housing supply to create more live/work opportunities
- Expand transportation choices and the Complete Street system
- Incentivize urban infill development in the city core and dense activity centers through zoning
- Incentivize energy efficient building siting, design and operation through zoning
- Expand the comprehensive stormwater management system to incentivize low impact development technologies
- Create a more predicable development permitting process

In Burlington, our urban fabric is compact and actively encourages mixed uses. As we work to make it even better we have the potential to further reduce pollution and congestion, enhance social interaction, improve the efficiency and effectiveness of public service delivery, and create more vitality when compared to a more suburban development pattern. Studies of residential developments have found that high-density development emits less than half as much GHG per capita as low-density development. Particularly, the National Academy of Sciences, in a recent study chartered by Congress, has found that compact mixed-use development is likely to reduce Vehicle Miles Traveled (VMT) and could directly and indirectly reduce energy use and greenhouse gas emissions.

planBTV-Downtown & Waterfront, recently developed by the City, clearly articulates the need for more housing in our downtown, more housing that is affordable to everyone. This additional housing will in turn allow more people to live closer to their workplace and services, therefore reducing their need to drive on a daily basis. Urban dwellers typically have lower energy costs and a smaller carbon footprint. Neighborhood activity centers, located throughout the city, also provide opportunities for bringing housing, shopping, working, playing and transportation choices closer together so it is easier for Burlingtonians to walk or bike. Connecting these nodes with frequent and convenient transit will ultimately create an overall more efficient and inclusive transportation system.

Recent storm events are indicative of why we need to re-think how we manage our stormwater. Here it's more about how we adapt to climate change. Turning "grey streets to green streets" will not only improve the management of stormwater but also actively encourage more trees and plantings which have an important role in the sequestration of CO2 and reduce the urban heat island effect. Green roofs and walls on our buildings are a great stormwater management tool which also helps to reduce heating and cooling costs.

Climate Factoids

Transit Accessible households use ~93 million fewer BTU's annually than their auto-dependent suburb counterparts (Jonathan Rose Companies, 2011)

Reducing a homes size by half (2,200 to 1,100 sqft) reduces its GHG emissions by ~36% (OR Dept. of Environmental Quality, 2010)

A typical SF home consumes an average of 108.4 million BTU's per year, while a multi-family building with at least 5 units uses only 54.4 million BTU's per year (US Energy Information Administration, 2005)

Goal: Reduce community-wide vehicle miles traveled (VMT) by 10% per capita by 2025.

Strategies

- Improve bicycle and pedestrian infrastructure
- Integrated transportation system improvements
- Create a downtown Transportation Management Association
- Price parking to maintain 85% utilization
- Develop infrastructure for fuel-efficient vehicles
- Develop a citywide bike/pedestrian plan

Burlingtonians are busy people: they commute to work, run errands, visit health care providers, and travel to recreate and play. Currently, fifty-one percent of the city's greenhouse gas emissions are produced by cars, trucks and buses. (This inventory excludes emissions from air travel, an approach that mirrors that of most cities.) To lower emissions, a high-quality transportation system, including a robust public transit network, and amenities to support biking, walking, and car sharing, are key. This, coupled with support for alternative fuel vehicles, such as a network of charging stations for the area's nascent but growing electric vehicle population, will greatly reduce GHGs.

Public Transit Solutions

Burlington is fortunate to have a variety of players involved in broadening our transportation options beyond the single occupancy vehicle. The Chittenden County Transportation Authority (CCTA) offers regular transit services to Burlington and surrounding communities. During the time this plan was written, CCTA daily ridership continued to grow. For example, ridership climbed 3.2% between 2010 and 2011, providing 2,510,959 total rides on their fixed-route service. More specifically, ridership on the Montpelier LINK increased by 21%, the Middlebury LINK by 10%, and the St. Albans LINK Express by 9% respectively. Continuing to work with CCTA on the expansion and increase of frequency of service in Burlington and beyond is crucial to reducing future greenhouse gas emissions.

Walking, Biking and Carsharing

Walking and biking are transportation choices that promote health and emit no or very few greenhouse gases. Burlington will reduce emissions if more stakeholders walk and bike and, use services such as CarShareVT. The "co-benefits" of these transportation options also make these appealing alternatives to single occupancy vehicle use. For example, research shows that carsharing can reduce overall household costs, and of course, walking and biking are important for overall physical health and well-being.

The IBM Smarter Cities Challenge Report proposes recommendations supporting the strategies of the Climate Action Plan:

- Enable electric vehicle (EV) sharing

See the Smarter Cities Report for more information

Goal: Reduce the amount of municipal vehicle miles traveled (VMT) by 10% by 2025.

Strategies

- Develop a government alternative employee commuting program
- Develop a government vehicle retirement and replacement program.
- Develop a government vehicle sharing/fleet management program

Although community-wide transportation generates the bulk of greenhouse gases (or approximately 205,000 tCO2e), 5,000 tCO2e are attributed to City operations, and staff commuting to work.

To help reduce emissions, while opening up needed parking and alleviating congestion, the City provides regional and local transit passes to all interested employees. The City has partnered with Local Motion on bike-commute trainings several bicycles available to staff for work-related travel. CarShare Vermont, one of the nation's first non-profit car sharing operations, is available to staff who drive for work. Offering the use of fuel efficient CarShare Vermont vehicles allows employees options beyond the city fleet, car rental, or personal vehicle use for work-related travel. And personal CarShare membership frees up city staff to take public transport to work by allowing them car share access during the day for private errands during the lunch hour.

To date, the City owns three compressed natural gas (CNG) recycling trucks. CNG emits far fewer particulates into the air, making it a more environmentally sound fossil fuel substitute. And because Burlington owns its own CNG filling station, it's less expansive to fill up CNG vehicles than similar vehicles that use standard gasoline. The Burlington Electric Department also recently purchased a biodiesel hybrid truck, a much more fuel efficient alternative. Still, the City should also consider every opportunity to better manage its vehicle fleet, ensuring that all vehicles are used to their full potential and that a larger proportion of the fleet uses more energy efficient and environmentally friendly fuels. This is especially true as new cars and trucks are purchased and old ones are phased out. An analysis of the current fleet usage and efficiency could provide opportunities for reduction of the fleet and increased fuel efficiency all the while reducing City operations.

Goal: Develop zoning, planning, and economic development policies that support local food production.

Strategies

- Develop public-private partnerships and infrastructure to support processing, preserving and storage of locally produced foods.
- Create and implement a policy for raising non-domesticated animals

By continuing to expand and grown Burlington's range of local food choices, we're not only reducing greenhouse gas emissions from the transportation of food from farm to plate, we're strengthening regional food security, building the local economy, and improving community health. Indeed the "co-benefits" of local food production, processing and consumption make the support of local food systems a winning proposition.

Fortunately, Burlington has a plethora of local food players. The Friends of Burlington Gardens, the Intervale Foundation, New Farms for New Americans, and Burlington's Parks and Recreation Department are just a few working on and supporting local food production and consumption. The Sustainable School Food Project, and the Burlington School Food Project, are working on education and to bring local food into area schools. Groups including UVM's Extension Service and Sustainable Agriculture Program, and the Urban Agricultural Task Force are addressing issues around policy, zoning, and research.

To create a more consistent supply of local products and enhance the local food supply chain, there needs to be a variety of places and means to market local farm products. The City already benefits from a seasonal farmers' markets, local grocery stores like City Market, and activities at the Intervale Food Hub. There is the additional opportunity for farm stands, a year-round market hall, street vendors selling locally-produced foods using and promoting local food products, specialty food retail outlets, joint marketing, and festivals celebrating local foods.

More attention is needed on the development of a robust public-private infrastructure to support additional processing, preserving and storage. Not only will this open up new ways and means to enjoy local food year round, these value-added activities can help spur economic development while lowing greenhouse gas emissions from the transportation of food. And while some work has gone into the support of non-domesticated animal production, there is still work to be done.

Goal: Increase energy efficiency in buildings.

Strategies

- Require new residential construction to be Vermont Energy Star for Homes (VESH) qualified
- Fully implement BED Advanced Metered Infrastructure (AMI) program
- Require new commercial construction to follow Core Performance guidelines
- Implement the "PACE" (Property Assessed Clean Energy) Program for residential properties and explore expansion to commercial properties
- Implement a deep energy efficiency program for government buildings
- Replace existing streetlights with LEDs
- Create a green roof policy and incentive program
- Revise and implement the Time of Sale ordinance
- Implement the Environmental Preferable Purchasing (EPP) Policy city-wide

Improving energy performance of city's buildings is a key goal of the plan. Achieving this will require a concerted effort by government and it's many public and private partners, including single and multi-unit property owners . Not only does increased building efficiency — and the efficiency of our infrastructure such as our City's streetlights — result in financial savings, it can help spur the local economy by creating employment opportunities.

Burlington's current success in energy efficiency can be attributed to two main players — Vermont Gas Systems (VTGas) and the Burlington Electric Department (BED). Working in tandem, VTGas and BED offer residents, businesses, and other Burlington-based entities ways to reduce energy use in buildings. Nationally recognized, BED's energy efficiency programs are the result of a bond to fund energy efficiency programs that supported program activities through 2002. Since 2003, BED customers (like all other Vermont electric customers) pay a small monthly Energy Efficiency Charge (EEC) that supports efficiency programs. When these funding sources are considered along with customers' direct costs, about $42 million has been invested in BED's energy efficiency efforts over the last 22 years. This includes about $19.3 million spent by BED and another $22.6 million in matching expenditures by BED customers. The overall effect has been dramatic. Annual electricity consumption in 2012 was 5.3 percent lower than in 1989. Energy efficiency investments save Burlington consumers $15.4 million of retail electric costs annually.

And now, with Advanced Metered Infrastructure being put in place throughout the city, property owners will have the power to better manage their energy consumption. This, coupled with the new commercial "PACE" program, Burlington stakeholders will have even more opportunities for efficiency and the creation of more renewable energy options.

The IBM Smarter Cities Challenge Report proposes recommendations supporting the strategies of the Climate Action Plan:

- Making Burlington synonymous with green technology
- Leveraging the Smart Grid (Advanced Metered Infrastructure)
- Promote energy efficiency execution (E3)
- Create a coordinated communication plan for "Burlington - the green tech city"

See the Smarter Cities Report for more information

Goal: Increase the use of cleaner and renewable energy sources.

Strategies

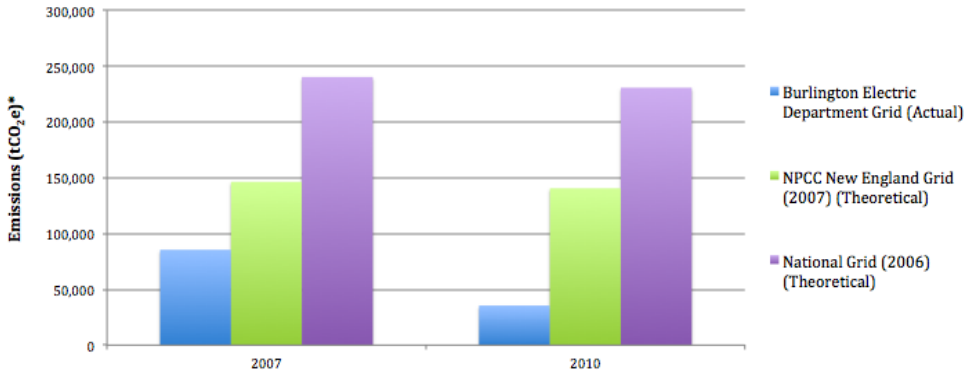
- Study feasibility of McNeil district heating project
- Implement additional "Solar on Schools" projects
- Implement BED "Renewable Energy Resource Rider" program
- Implement a "Solar City" project on municipal buildings
- Develop methane gas capture and CHP potential at City's wastewater treatment plants

To reduce our greenhouse gases, Burlington should strive for higher efficiency from our existing energy sources and continue to work towards its goal of 100% renewable power. Work on this front will not only reduce emissions, but protect us from the whimsical forces of the traditional energy market.

City Market Solar Panels

As a municipal department for the City of Burlington, Burlington Electric Department has a long history of sourcing electricity from clean power mixes. This is reflected in the lower emissions from the Burlington Electric Department Grid, shown in blue in the graph below. Generating electricity with fossil fuels contributes to climate change. BED has long been a leader in renewable energy development. BED's 2012 Integrated Resource Plan established a goal to continue seeking long-term renewable resources to fill the remaining supply gap without substantial rate impacts. Since the 2012 IRP was filed in September, 2012, BED has executed a five-year contract for energy from small existed hydro facilities, received approval to exercise the option and started discussions to pursue purchasing the Winooski One hydro facility, and the Georgia Mountain Community Wind Project in Georgia Vermont has come on line and begun delivering energy. Purchasing the Winooski One hydro facility will meet another 8 - 9% of the city's annual energy needs.

City of Burlington - 2007 and 2010 Electricity Emissions by Grid



The 2007 Burlington Electric Department Grid emissions were applied to the 2007 usage and the 2010 Grid emissions were applied to the 2010 usage. For theoretical purposes, the emissions factors for the regional grid, the NPCC New England Grid (2007), shown in green below, and the National Grid (2006), shown in purple in the graph below, were applied to the 2007 and 2010 usage. The NPCC New England Grid provides cleaner electricity than the National Grid, but not as clean as the Burlington Electric Department Grid.

Under Mayor Weinberger's initiative, on November 13, 2012, the City Council passed a resolution to waive all building, electrical, plumbing and zoning permit fees associated with the installation of solar photovoltaic panels and thermal hot water equipment for a period of one year. This is aimed at reducing barriers for such installations as well as strengthening Burlington's commitment clean and locally generated energy.

The IBM Smarter Cities Challenge Report proposes recommendations supporting the strategies of the Climate Action Plan:

- Optimize the Joseph C. McNeil

See the Smarter Cities Report for more information

Goal: Increase carbon storage and sequestration with additional forest and tree coverage.

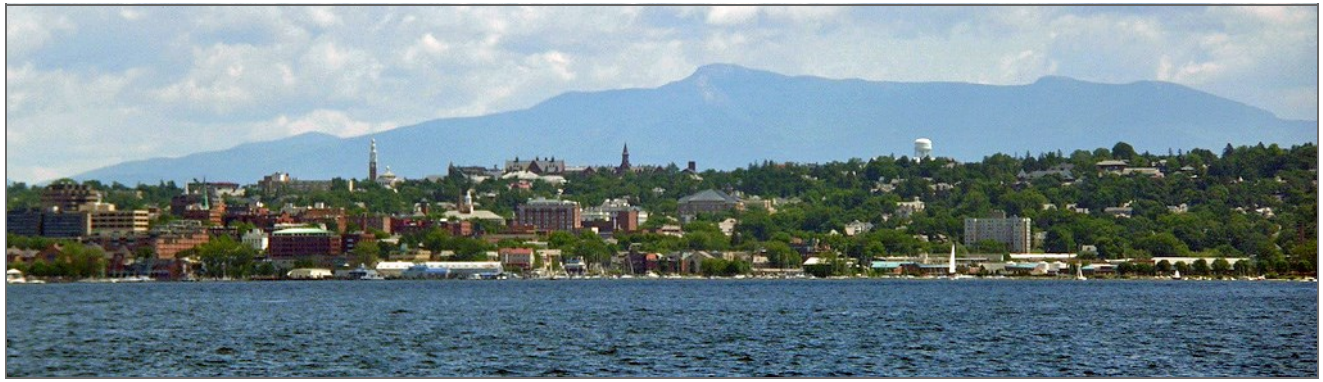
Strategy

- Increase the Urban Tree Canopy (UTC)

Research indicates that carbon sequestration — or the process by which carbon is captured and stored to avoid release into the atmosphere — is a sound and viable way to reduced greenhouse gasses. Because trees sequester carbon, Burlington is fortunate to have an extensive tree canopy, approximately 40% of Burlington's land cover mass. Not only do trees sequester carbon, Burlington's urban forest, a mosaic of planted landscapes and what remains of the native forest, is a reflection of the city's health, well being, and livability. It is an important part of Burlington's character, giving the City a special sense of place.

Our tree canopy also offers additional benefits. The air and water are cleaner because the trees and plants remove pollution from the air and reduce run-off. Open spaces and urban stream corridors define a sense of space in our communities while providing a quiet respite from hectic urban life. Neighborhoods with tree-lined streets offer shade and protect us from inclement weather. Shoppers frequent shaded business districts where trees help save energy, reduce noise, and soften the hard edges of structures and paved areas.

Burlington has several key players, including Branch Out Burlington (BOB), working to protect, expand and grow our tree canopy. A volunteer organization, BOB's goal is to promote a vision of a city graced by a variety of beautiful and healthy trees, and a citizenry actively involved with the perpetual expansion and preservation of our urban forest.



Goal: Reduce the amount of waste sent to landfills

Strategies

- Implement a residential organics collection program
- Explore a residential Pay As You Throw (PAYT) program
- Require recycling bins at all public facilities and events
- Increase the use of reusable shopping bags
- Work to consolidate trash haulers by neighborhood or district
- Require all major construction and demolition projects to submit waste management plans

Burlington produces an estimated 34,000 tons of waste annually. To reduce the amount of waste we generated as a community along with the associated environmental costs of transportation, individuals, government, and the private sector must work together. Much of this effort will need to focus on behavior change, and encouraging stakeholders to not only comply with mandatory recycling, but to compost and think critically about reducing waste at the point of purchase.

The waste reduction goal also requires that Burlington restructure its methods of garbage pickup and transport. Currently, residences and businesses contract with haulers directly to pick up trash and compostable materials; the City picks up recyclables. New approaches are being explored to reduce the amount of driving currently required to pickup waste, including consolidating trash hauling by district or neighborhood.

And while the majority of trash is generated at the community level, over 1,600 tons is generated by City government. To reduce this, the City of Burlington recently implemented a waste reduction program in all City buildings, including composting. By simply composting brown paper towels in the staff's City Hall restrooms, approximately 2,400 gallons of waste will be diverted from the waste stream annually.

Landfill in Moretown, VT

Moving Forward

The Burlington Climate Action Plan identifies a coordinated set of strategies that everyone who lives in, works in or visits Burlington can adopt to help reduce our city's carbon footprint and enhance our quality of life. It is a call to action for each of us to be thoughtful, persistent and committed.

Most of the strategies in the Plan will provide net benefits to residents, businesses and other organizations. While we recognize that these are aggressive goals, they can be achieved by working together, spending money wisely, accomplishing multiple objectives with existing programs and harnessing new funds from federal, state and local government, along with utilities, foundations and corporations. As we move forward, each strategy must be continuously assessed and monitored. To help with that process, the City's Green Team has been formed to review performance against our goals and to recommend revisions, adjustments and improvements.

Timely and efficient implementation this plan will require regular updates of our greenhouse gas inventory so that progress can be tracked, allowing the City to evaluate and re-evaluate the effectiveness of the strategies. It is also essential to note that current strategies might change or new strategies might surface depending on emerging technology, change in financial and staff resources, and as our commitment to climate planning grows. These continuous efforts mean that the Climate Action Plan is a work-in-progress, requiring on-going time, diligence, and effort.

The goal and strategies identified below have been developed and added to ensure a seamless and constant implementation of the strategies identified in this plan:

GOAL: Ensure the Implementation of the Climate Action Plan (CAP) Through Constant Coordination with Stakeholders and Regular Annual Assessment of the City's Progress.

- Develop a progress assessment structure that would include: annual progress report format, GHG emissions inventory 3-year update and periodical revisit of all strategies' relevance.
- Create a **Sustainability Coordinator** position responsible for the management and implementation of Burlington's Climate Action Plan. This position will involve assessing progress as well as overseeing the involvement of partner agencies such as the City's Green Team.
- Empower the City's Green Team to take on the implementation of the Climate Action Plan in conjunction with the Sustainability Coordinator.

Our Strategies in Details

In order to achieve our reduction targets, we've got to get to work. The next step is to prioritize, with guidance from the City Council and other leaders, the following strategies — and then get started on implementation. Some will have limited up front cost, while others will require a substantial investment. In the end, however, most will bear financial rewards in the reduction of maintenance and operation costs.

NOTE: These recommended strategies came out of a public process and are not necessarily an exhaustive list nor are they completely defined and detailed. Further refinement should be expected based on actual needs and opportunities at the time of implementation.

Compact Mixed-Use Development	Leader
Promote an active and vibrant downtown and waterfront core - planBTV-Downtown & Waterfront presents a good framework for the promotion of a vibrant downtown. Ensure that the ideas outlined in planBTV are implemented.	All City Departments
Incentivize urban infill development in the city core and most dense activity centers through zoning - Continue to ensure that zoning regulations incentivize and allow for compact mixed-use development to occur in neighborhood activity centers.	Planning & Zoning Dept.
Expand housing choices and grow the downtown housing supply to create more live/work opportunities - Remove existing regulatory barriers to the development of more housing downtown and provide additional incentives through regulations, programs, etc.	Planning & Zoning Dept.
Expand transportation choices and the Complete Street system - Implement the 2011 Transportation Plan to the greatest extent possible, ensuring that a Complete Street approach is taken for every reconstruction or redesign project.	Dept. of Public Works
Incentivize energy efficient building siting, design and operation through zoning - Develop a form-based code that will ensure efficient building design and siting, and continue to require the use and implementation of the Energy Code.	Planning & Zoning Dept.
Expand the comprehensive stormwater management system to incentivize low impact development technologies - Develop and implement additional stormwater management policies for new development and find ways to incentivize their use.	Dept. of Public Works
Create a more predictable development permitting process - Develop a form-based code that improves the development review and permitting process, increasing its predictability for developers.	Planning & Zoning Dept.
Community Transportation	**Leader**
Improve bicycle and pedestrian infrastructure - Build upon the Complete Streets guidance integrating on-street bicycle and pedestrian facilities into all future infrastructure improvements to City streets.	Dept. of Public Works
Integrated transportation system improvements - Build upon the City's Transportation Plan to implement several improvements of an integrated transportation system including the creation of a downtown transit center, Park and Ride and Auto Intercept lots to capture cars before they enter City neighborhoods, and increased frequency of transit in corridors servicing downtown and auto intercept facilities.	Dept. of Public Works
Create a downtown Transportation Management Association (TMA) - Develop a downtown transportation management association that plans, develops, and manages all employee transportation and parking programs, infrastructure, and related facilities. The goal of the TMA would be to offer and improve cost-effective and convenient alternative transportation services while simultaneously reducing travel demand and traffic congestion and improving air quality.	TBD

Community Transportation	Leader
Price parking to maintain 85% utilization - Increase parking rates to market-based rates and to maintain an 85% parking utilization rate. This action will better relate parking supply with demand, increase the likelihood of available spaces, reduce traffic congestion, improve air quality, and increase revenues for the City.	Dept. of Public Works
Develop infrastructure for fuel-efficient vehicles - This proposed action would develop infrastructure and incentives for fuel-efficient vehicles. This might include charging stations for electric and electric-hybrid vehicles and fueling stations for CNG and other alternative fuel vehicles.	Dept. of Public Works
Develop a Citywide Bike/Pedestrian Plan - This proposed action would build upon the City's North/South Bike Plan by taking a more comprehensive look at the City's existing bike/pedestrian infrastructure and designing and implementing necessary improvements.	Dept. of Public Works
Government Transportation	**Leader**
Develop a government alternative employee commuting program - Reduce government employee commuting miles by encouraging employees to commute through emissions-free modes (telecommuting, walking, and biking), as well as less impactful modes (car pooling, ridesharing, and mass transit). It would also include incentives such as a parking cash-out program.	City Green Team
Develop a government vehicle retirement and replacement program - Retire 5% of the government's vehicle fleet and replacing 25% of the gasoline-powered vehicles with hybrids; retire twelve vehicles and replace 62 gas-powered vehicles with hybrids over a five year period.	Dept. of Public Works
Develop a government vehicle sharing/fleet management program - Includes vehicle acquisition, assignment and maintenance with a focus on cost-effectiveness and emissions reduction. Could also include other functions, such as vehicle financing, driver management, speed management, fuel management, health and safety management, regulatory compliance, and validating green initiatives.	Dept. of Public Works
Local Gardens, Farms and Food PRoduction	**Leader**
Develop public-private partnerships and infrastructure to support processing, preserving and storage of locally produced foods - Develop public-private partnerships and infrastructure for the processing, preserving and storage of locally produced foods.	TBD
Create and implement a policy for raising non-domesticated animals - Create and adopt a clear and consistent policy for raising non-domesticated animals, for egg, meat, and milk production, in city neighborhoods and urban agriculture areas.	TBD
Energy Efficiency in Buildings	**Leader**
Require new residential construction to be Vermont Energy Star for Homes (VESH) qualified - Require new residential construction to be Vermont Energy Star for Homes (VESH) qualified. VESH are designed and built using best practices to save energy by reducing air leaks and thermal bypass, and by requiring high efficiency heating and appliances.	Burlington Electric Dept.
Fully implement BED Advanced Metered Infrastructure (AMI) program - BED is in the process of installing smart meters in all buildings in the City of Burlington. Smart meters will provide data to BED and its customers in 15 minute intervals, and offer two-way communication. This better data can then be used to achieve increased efficiency.	Burlington Electric Dept.
Require new commercial construction to follow Core Performance guidelines - Require new commercial construction to follow Core Performance guidelines, a program offered by BED, and Vermont Gas. Core Performance is a prescriptive guide to reduce energy use in commercial buildings by 20-30%.	Burlington Electric Dept.

Energy Efficiency in Buildings	Leader
Implement the "PACE" Program for residential properties and explore expansion to commercial properties - The PACE program will allow residential property owners to access long term municipal financing to make eligible energy efficiency and renewable energy improvements to their buildings. By opting into a special tax assessment district, property owners pay for these improvements via property taxes over a period up to twenty years.	Burlington Electric Dept.
Implement a deep energy efficiency program for government buildings - Perform deep energy efficiency improvements in all municipal buildings. Deep energy retrofits would include extensive renovations to existing structures that use the latest in energy-efficient materials and technologies and results in significant energy reductions.	Burlington Electric Dept.
Replace existing streetlights with LEDs - Continue to replace all existing streetlights (approximately 3,300) with LEDs over a 10-year period.	Dept. of Public Works
Create a Green Roof policy and incentive program - Create incentives to encourage that all new flat roofs at or under 30 degree-pitch, both private and public have to be vegetated. If old roofs have to be retrofitted, the building owner may be able to receive public financial support for a green roof.	Dept. of Public Works
Revise and implement the Time of Sale ordinance - Build upon the existing residential rental housing time of sale energy efficiency ordinance by applying it to all residential and commercial buildings. Furthermore, it proposes that, as a condition of sale, all buildings must receive an energy inspection and rating that is available to prospective buyers.	Code Enforcement Office
Implement the Environmental Preferable Purchasing (EPP) Policy city-wide - Fully implement the City's existing environmental purchasing policy, requiring that it be applied to all procurement decisions city-wide.	City Green Team
Renewable Energy Resources	**Leader**
Study the feasibility of McNeil district heating project - Use McNeil power plant as a heat source for a district heating system that would improve McNeil's efficiency, make use of some of its waste heat, and provide heat to consumers at a relatively low and predictable price.	Burlington Electric Dept.
Implement additional "Solar on Schools" projects - Put solar PV panels on the City of Burlington schools' roofs. The panels on seven schools will be owned and operated by a private third-party development partner who can take advantage of federal and state tax credits, which the City cannot.	School District
Implement BED "Renewable Energy Resource Rider" program - Encourage residents and businesses to install solar PV panels. This is achieved through setting a predictable and stable rate above the retail cost of electricity, and therefore above the rate for standard net metered production.	Burlington Electric Dept.
Implement a "Solar City" project on municipal buildings - Install solar photovoltaic panels on appropriate city-owned buildings with the goal of providing 1MW aggregate power and helping to minimize the occurrence of peak load.	Burlington Electric Dept.
Develop methane gas capture and Combined Heat and Power (CHP) potential at City's wastewater treatment plants - Fully develop the potential for capturing methane gas and generating electricity and/or heat from the City's decentralized waste water treatment facilities.	Dept. of Public Works
Urban Forestry and Carbon Sequestration	**Leader**
Increase the Urban Tree Canopy (UTC) - This proposed action would increase the urban tree canopy (UTC) by planting a total of 588 trees per year and by maintaining the existing urban tree canopy. This would be achieved both on public and private property.	Parks Department

WASTE REDUCTION AND RECYCLING	LEADER
Implement residential organics collection program - Collect residential organic food waste (no yard waste) to be composted and would be modeled after the existing City residential recycling program, thus having a similar infrastructure and cost profile.	Dept. of Public Works
Explore a residential Pay As You Throw (PAYT) program - Change the current residential collection payment system to a system in which residents pay per unit of trash collected. Programs like these result in a decrease of solid waste, as well as overall cost savings to participants. The current physical system would remain the same.	Dept. of Public Works
Require recycling bins at all public facilities and events - Require that recycling bins are available and maintained at all public facilities and events.	Parks & Recreation Dept.
Increase the use of reusable shopping bags - Create incentives for increase usage of reusable shopping bags and the complementary reduction of disposable plastic bags.	Businesses
Work to consolidate trash haulers by neighborhood or district - Consolidate trash haulers by neighborhood or district, thereby limiting the number of trucks driving through the city, reducing vehicle miles and congestion, and improving air quality.	Chittenden Solid Waste District (CSWD)
Require all major construction and demolition projects to submit a waste management plan - Require construction and demolition (C&D) projects to submit a waste management plan. Such a plan would include: waste recycling, salvage or reuse goals; estimated types and quantities of materials or waste generated from the project site; proposed and intended disposal methods for these materials; and detailed instructions for subcontractors and laborers on how to safely separate or collect the materials at the job site.	Planning & Zoning Dept.

ACKNOWLEDGEMENTS

Mayor
Miro Weinberger

Key City Staff
Jennifer Green, Community and Economic Development
Sandrine Thibault, Department of Planning & Zoning

Other Key Participants
Beth Truzanksy, Community and Economic Development Office
Bob Kiss, Mayor of Burlington (formerly)
Chris Burns, Burlington Electric Department
Chris Giard, Burlington School District
Dan Bradley, Department of Public Works (formerly)
David E. White, Department of Planning & Zoning
Gary Greenwood, Department of Public Works
Glenn McRae, Intervale Center (formerly)
Heather Kendrew, Burlington International Airport
Jake Yanulavich, Burlington Electric Department
James Gibbons, Burlington Electric Department
Jan Schultz, District Energy System Committee
Jarlath O'Neil-Dunne, University of Vermont
Jay Appleton, Department of Planning and Zoning
Jim Flint, Friends of Burlington Gardens
Jon Adams-Kollitz, Parks and Recreation Department
Julia B. Breul, University of Vermont
Ken Nolan, Burlington Electric Department
Laurie Adams, Department of Public Works
Marge Keough, Chittenden Solid Waste District
Mary Sullivan, Burlington Electric Department
Megan Moir, Department of Public Works
Nancy Plunkett, Chittenden Solid Waste District
Nathan Wildfire, Community and Economic Development Department
Nicole Losch, Department of Public Works
Pablo S. Bose, University of Vermont
Peter Owens, Community and Economic Development Department
Ron Lafountain, Burlington Electric Department
Steve Roy, Department of Public Works
Tim Grover, Department of Public Works
Tracey Tsugawa, University of Vermont & Vermont Human Rights Commission
Warren Spinner, Department of Parks & Recreation

Consultants
Spring Hill Solutions
Shelly Martin, Earth Shift, formerly of Spring Hill Solutions

Funding for this project was largely provided by the Federal Recovery Act – Energy Efficiency and Conservation Block Grants – Formula Grants