

**BURLINGTON
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 their associated impacts. Municipalities design and utilize climate action plans as customized roadmaps for making informed decisions about where and how to achieve the largest and most cost-effective emissions reductions that are in alignment with other municipal plans, at a minimum, include an inventory of existing emissions, reduction goals or targets, and analyzed and prioritized 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 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

1996

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

2000

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

2009

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

2016

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

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.

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.

2010

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

WHY WE CARE?

WHAT IS CLIMATE CHANGE ?

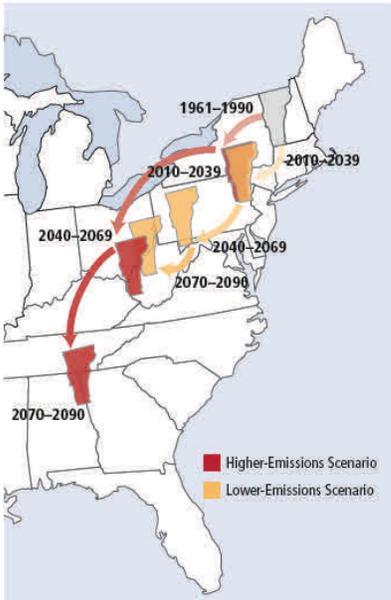
The greenhouse effect is the process by which the atmosphere traps some of the sun's energy, warming the Earth and moderating our climate. A human-driven increase in 'greenhouse gases' has enhanced this effect artificially. These greenhouse gases include carbon dioxide, produced by burning fossil fuels 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 will experience 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 winter temperatures rising between 1970 and 2000. If higher emissions prevail, seasonal average temperatures across Vermont are projected to rise 9°F to 14°F in winter and 7°F to 14°F in summer by late-century, while lower emissions would result in less 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 a decrease in precipitation on the order of 20 to 30 percent. Slightly greater decreases are projected under the higher-emissions scenario, which would also feature less winter precipitation falling as snow. Heavy, damaging rainfall events have already increased measurably across the region. Intense rains struck the region in 2011 during Irene, for example, causing significant damage. The frequency and severity of heavy rainfall events is expected to rise further under the higher-emissions scenario.

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



IMPACTS OF CLIMATE CHANGE ON VERMONT AND B

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 plant-stimulating carbon dioxide (CO₂) in the air are also expected to accelerate seasonal pollen production over the next several decades under the higher-emissions scenario. This could extend the allergy season, increase asthma risks, and exacerbate symptoms for residents of Vermont.

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 LAND

In the last of storm ev and in Burli seen incre Champlain Hurricane S equate to h have a direc ture in the waterfront always han the city wh systems are treated was Given the a jor storm e we should breaks, was

Bank erosi vere floodin bike path a quickly com 2011 event eroded bar individuals, has to ultim

Limited rec creased wa due to floo i.e.: beach or boating,



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, 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 implementing strategies in order to create an integrated response that goes far beyond reducing carbon emissions. Addressing these issues will 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 emissions reduction projects be enhanced?
- In what ways does a more inclusive set of active stakeholders create a more effective and innovative emissions reduction plan?
- What are the synergies between equity and inclusion goals and climate action goals and how do these crossovers advance 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 addressed in the future to create a more comprehensive and transparent plan of action.

<p>Housing</p> <ul style="list-style-type: none"> ◆ 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 	<p>Infrastructure and Transportation</p> <ul style="list-style-type: none"> ◆ Individuals' proximity to affordable, reliable public transportation ◆ Distance from town center and shopping centers proportional to levels of income and wealth 	<p>Extraordinary Impacts</p> <ul style="list-style-type: none"> ◆ ◆
<p>Food Security</p> <ul style="list-style-type: none"> ◆ 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 	<p>Participation, outreach, and education</p> <ul style="list-style-type: none"> ◆ Equitable community involvement in policy and decision-making, zoning and land use planning ◆ Build on the work of the diverse stakeholders through a process 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 to address and deal with the issues of climate change and equity.

WHERE ARE WE NOW WITH GOVERNMENT OPERATIONS EMISSIONS

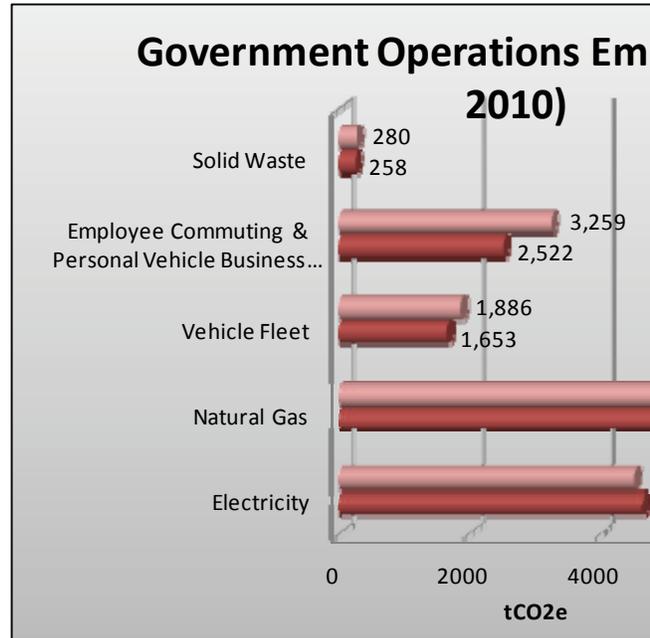
While based on extensive research and analysis, the Burlington Climate Action Plan represents a snapshot in time using the best information available. Emissions inventory results depicted below and in the next few pages are always changing. The 2007 and 2010 inventories were prepared using the Greenhouse Gas (GHG) Emissions Analysis Protocol developed by the Climate Registry and ICLEI. It is our hope to update this information every 3 years. While the Protocol is not perfect (for example, the Protocol does not consider emissions from biomass plants), at this moment in time, it is the best available.

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 tCO₂e. This decreased by 2% in 2010 to around 20 million kWh and 4,537.2 tCO₂e.
- In 2007, the City Government consumed over 965,000 CCFs of natural gas, emitting 5,213.4 tCO₂e. This increased by 25% in 2010 to over 1.2 million CCFs and 6,514.8 tCO₂e.
- 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 tCO₂e, which increased by 14% in 2010 when over 210,000 gallons (27,323.2 MBTU) were consumed and 1,885.9 tCO₂e 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 & personal vehicle business travel emitted 2,521.9 tCO₂e. The average commute distance was 11 miles (one way) in 2007 and 12 miles (one way) in 2010. In 2010, nearly 8.0 million miles were driven for commuting purposes and around 330,000 miles were driven in personal vehicles for business & personal vehicle business travel. Employee commuting & personal vehicle business travel generated 3,259.0 tCO₂e, a 29% increase from 2007. The average commute distance was 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 tCO₂e. This increased to nearly 1,800 tons of waste in 2010 and 280.0 tCO₂e.

These results show that by improving the energy efficiency of city-owned buildings and encouraging city workers to use alternative modes of transportation, the city can have a strong impact on reducing annual GHG emissions. These types of initiatives would also have a direct impact on the city's budget and its staff.

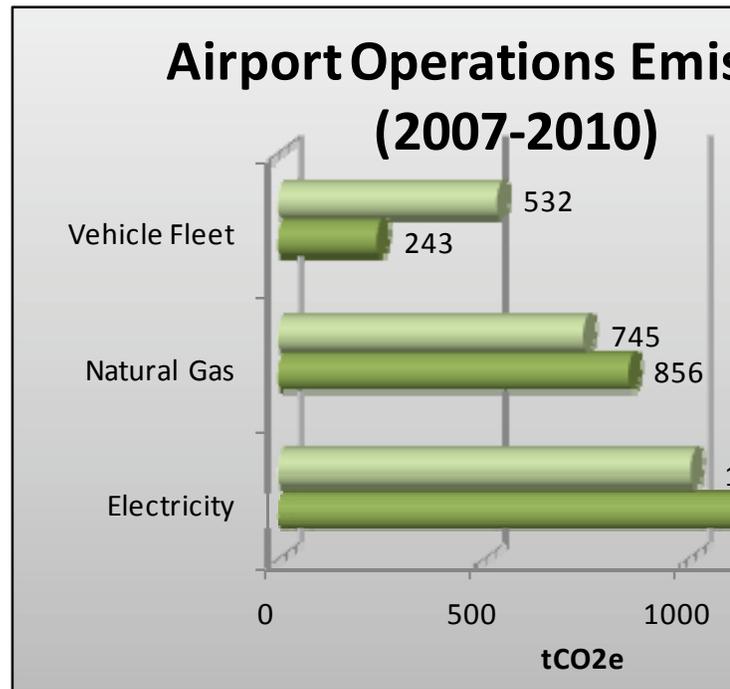


WHERE ARE WE NOW WITH THE AIRPORT'S EMISSIONS

The City of Burlington's Airport generated 2,219.4 tCO₂e in 2007, increasing by 3% to and 2,287.2 tCO₂e in 2010. This translates to increasing 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 tCO₂e. This decreased by 10% in 2010 to around 1,009.2 tCO₂e.
- In 2007, the Airport consumed nearly 160,000 CCFs of natural gas, emitting 856.1 tCO₂e. This decreased by 13% in 2010 to around 138,000 CCFs and 745.1 tCO₂e.
- The Airport's vehicle fleet consumed around 25,000 gallons of diesel, biodiesel, and gasoline (3,493.3 MBTU) in 2007, emitting 249.2 tCO₂e. In 2010 these figures increased to over 48,000 gallons (6,517.2 MBTU) consumed and 543.5 tCO₂e generated.
- The Airport spent over \$963,000 in 2007, decreasing by 2% to just over \$947,000 in 2010.

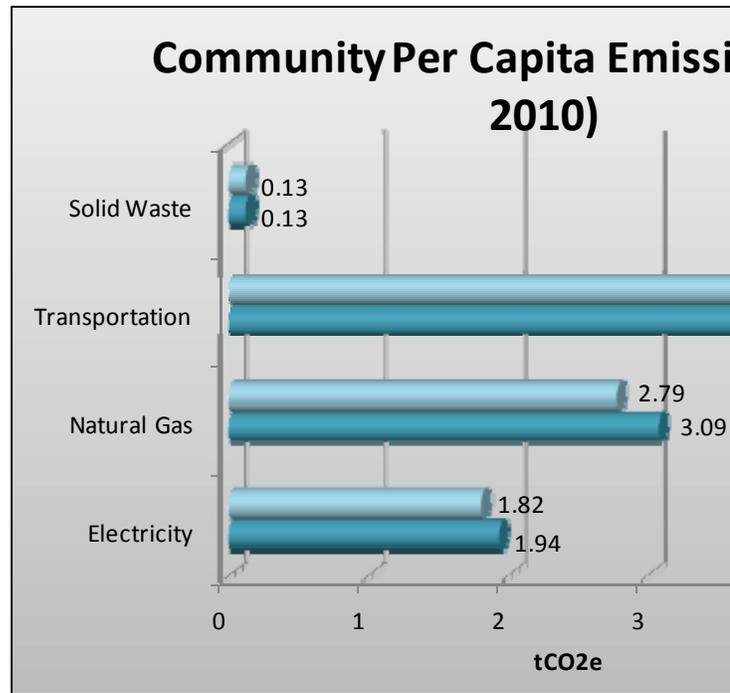
Since these numbers were calculated, the airport has undertaken aggressive energy efficiency efforts. Projects include: replacing incandescent taxiway lighting with LEDs; replacing terminal, roadway, and parking lot lighting with CFL and LEDs; replacing parking garage lighting with LEDs; replacing aging 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 tCO₂e in 2007, increasing by 6% to 404,778.6 tCO₂e 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 tCO₂e. This decreased by 4% in 2010 to around 346.2 million kWh and 76,474.4 tCO₂e.
- In 2007, the Community consumed nearly 23.4 million CCFs of natural gas, emitting 126,496.0 tCO₂e. This decreased by 7% in 2010 to nearly 21.7 million CCFs and 117,242.6 tCO₂e.
- With over 259 million vehicle miles traveled (VMT) in 2007, Community transportation emitted 169,102.0 tCO₂e. This increased by 24% in 2010, when 320 million VMT were driven and 205,487.0 tCO₂e 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 tCO₂e. This increased by 1% to in 2010 or 5,574.6 tCO₂e.



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.

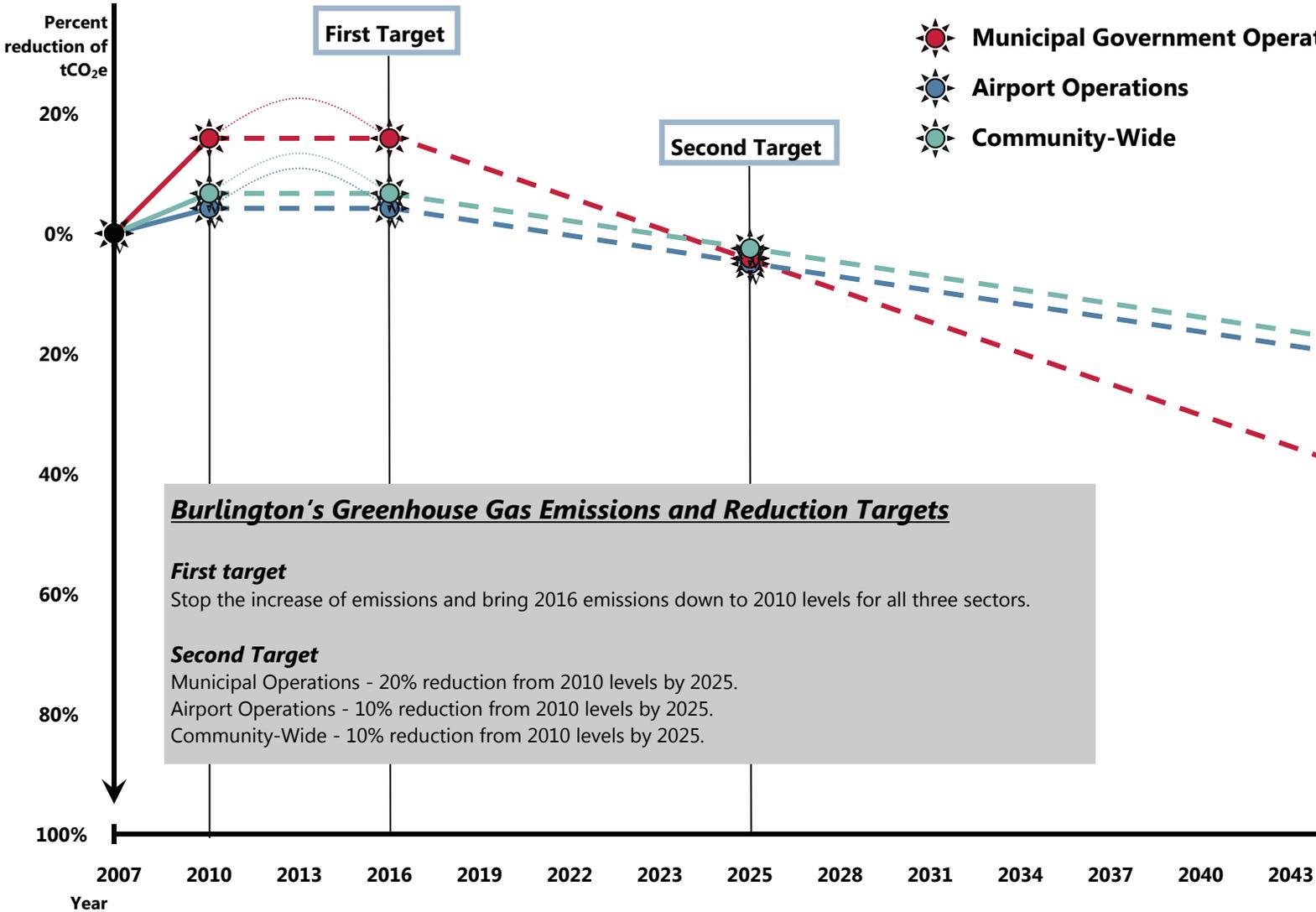
Community - 2007 and 2010 Total Emissions

Source	2007 GHG Emissions (tCO ₂ e)	Percent of Total 2007 City Emissions	2010 GHG Emissions (tCO ₂ e)
Electricity	79,664.2	21%	76,474.4
Natural Gas	126,496.0	33%	117,242.6
Transportation	169,102.0	44%	205,487.0
Solid Waste	5,500.1	1%	5,574.6
TOTAL	380,762.3	100%	404,778.6

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

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 and considering that emissions have increased between our two inventories. The chart below illustrates specific reduction targets for municipal operations, airport operations, and the community respectively. The first target requires leveling off the growth of emissions by 2016 and then reducing them. The second target involves an actual reduction of the 2010 emission 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 history. Between September 2008 and February 2009, over 100 community volunteers and City staff gathered in order to develop emissions mitigation strategies under seven of the following eight themes. This work resulted in over 200 recommendations 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 theme 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 activity centers through zoning
- Incentivize energy efficient building standards through zoning
- Expand the comprehensive stormwater management plan and incentivize low impact development techniques
- Create a more predictable development 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 work and therefore reducing their need to drive on a daily basis. Urban dwellers typically have a smaller carbon footprint. Neighborhood activity centers, located throughout the city, also promote compact housing, shopping, working, playing and transportation choices closer together so it is easier to walk or bike. Connecting these nodes with frequent and convenient transit will ultimately create a 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 manage our urban heat island effect. 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.

Fun Climate Factoids

- Transit Accessible households use ~93 million fewer BTU's annually than their counterparts (Jonathan Rose Companies, 2011)
- Reducing a home's size by half (2,200 to 1,100 sqft) reduces its GHG emissions by 50% (Environmental Quality, 2010)
- A typical SF home consumes an average of 108.4 million BTU's per year, while a typical multi-unit building with at least 5 units uses only 54.4 million BTU's per year (US Energy Information Administration, 2010)

Goal: Reduce community-wide vehicle miles traveled 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 path

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 includes 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 in 2010 and 2011, providing 2,510,959 total rides on their fixed-route service. More specifically, ridership on the Montpelier LINK increased by 10%, the Winooski LINK by 10%, and the St. Albans LINK Express by 9% respectively. Continuing to work with CCTA on the expansion and improvement 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 emissions. Burlington will reduce emissions if more stakeholders walk and bike and, use services. The "co-benefits" of these transportation options also make these appealing alternatives. For example, research shows that carsharing can reduce overall household vehicle ownership. Walking and biking are important for overall physical health and well-being.



The IBM Smarter Cities Challenge Report provides guidance on 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 10% by 2025.

Strategies

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

Although community-wide transportation generates the bulk of greenhouse gases (or approximately 205,000 tCO₂e), 5,000 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 that convert waste into the air, making it a more environmentally sound fossil fuel substitute. The City owns its own CNG filling station, it's less expensive to fill up CNG vehicles than standard gasoline. The Burlington Electric Department also recently purchased a much more fuel efficient alternative. Still, the City should also consider evaluating its vehicle fleet, ensuring that all vehicles are used to their full potential and the fleet uses more energy efficient and environmentally friendly fuels. This is done as new trucks are purchased and old ones are phased out. An analysis of the current fleet could provide opportunities for reduction of the fleet and increased fuel efficiency in City operations.

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

Strategies

- Develop public-private partnerships and infrastructure to support processing, preserving and storage of local food products
- 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 local farm products. The City already benefits from a seasonal farmers’ markets, local grocery stores like City Market, and a Food Hub. There is the additional opportunity for farm stands, a year-round market hall, street vendors selling locally-produced 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 for processing, preserving and storage. Not only will this open up new ways and markets around, these value-added activities can help spur economic development which offsets emissions from the transportation of food. And while some work has gone into supporting 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 buildings
- Replace existing streetlights with LED
- Create a green roof policy and incentives
- Revise and implement the Time of Day program
- Implement the Environmental Preference Program city-wide

Improving energy performance of city's buildings is a key goal of the plan. Achieving this will require a concerted effort by public and private partners, including single and multi-unit property owners. Not only does increased building efficiency — 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 programs (VTGas) and the Burlington Electric Department (BED). Working in tandem with residents, businesses, and other Burlington-based entities, ways to reduce energy consumption have been recognized. BED's energy efficiency programs are the result of a bond to fund these programs that supported program activities through 2002. Since 2003, BED customers (residential and commercial customers) pay a small monthly Energy Efficiency Charge (EEC) that supports these programs. These funding sources are considered along with customers' direct costs, all of which have been invested in BED's energy efficiency efforts over the last 22 years. This includes \$22.6 million from BED and another \$22.6 million in matching expenditures by BED customers. The results have been dramatic. Annual electricity consumption in 2012 was 5.3 percent lower than in 2002. These investments save Burlington consumers \$15.4 million of retail electric costs a year.

And now, with Advanced Metered Infrastructure being put in place throughout the city, property owners will have the power to reduce 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 strategy:

- 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 city buildings
- Develop methane gas capture and use at wastewater treatment plants

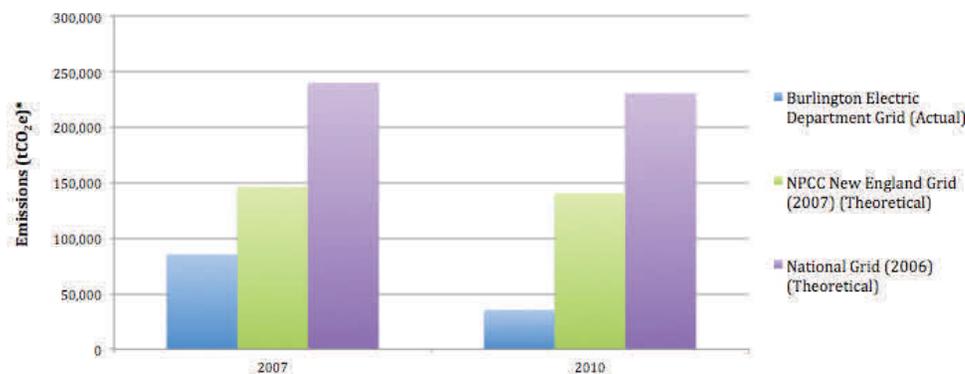
To reduce our greenhouse gases, Burlington should strive for higher efficiency from our existing energy sources and continue to work towards its goal of 100% renewable power. Work on this front will not only reduce emissions, but protect us from the whimsical forces of the traditional energy market.

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 existing hydro



City Market Solar Panels

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.

facilities, received approval to exercise the option to pursue purchasing the Winooski One hydroelectric project. The Vermont Community Wind Project in Georgia Vermont has begun delivering energy. Purchasing the Winooski One will meet another 8 - 9% of the city's annual energy needs.

Under Mayor Weinberger's initiative, on November 15, 2011, the City Council passed a resolution to waive all building zoning permit fees associated with the installation of solar panels and thermal hot water equipment. This was aimed at reducing barriers for such installations. This is a reflection of Burlington's commitment clean and locally sourced energy.

The IBM Smarter Cities Challenge Report proposes the following 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 trees 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 in a sound and viable way to reduced greenhouse gasses. Because trees sequester carbon, Burlington is fortunate to have an estimated 40% of Burlington's land cover mass. Not only do trees sequester carbon, Burlington's urban forest, a mosaic of parklands and remnants of the native forest, is a reflection of the city's health, well being, and livability. It is an important part of Burlington's 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. 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 in the 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 district
- Require all major construction and demolition projects to have 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 i

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. We note that current strategies might change or new strategies might surface depending on emerging technology, changing resources, and as our commitment to climate planning grows. These continuous efforts mean that the Climate Action Plan requires 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 CONSULTATION 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, and a regular 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, the most promising 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 complete. Further refinement should be expected based on actual needs and opportunities at the time of implementation.

COMPACT MIXED-USE DEVELOPMENT

Promote an active and vibrant downtown and waterfront core - planBTV-Downtown & Waterfront presents a good framework for creating a vibrant downtown. Ensure that the ideas outlined in planBTV are implemented.

Incentivize urban infill development in the city core and most dense activity centers through zoning - Continue to ensure that zoning incentivizes and allows for compact mixed-use development to occur in neighborhood activity centers.

Expand housing choices and grow the downtown housing supply to create more live/work opportunities - Remove existing regulations that impede the development of more housing downtown and provide additional incentives through regulations, programs, etc.

Expand transportation choices and the Complete Street system - Implement the 2011 Transportation Plan to the greatest extent possible so that a Complete Street approach is taken for every reconstruction or redesign project.

Incentivize energy efficient building siting, design and operation through zoning - Develop a form-based code that will ensure energy efficient design and siting, and continue to require the use and implementation of the Energy Code.

Expand the comprehensive stormwater management system to incentivize low impact development technologies - Develop additional stormwater management policies for new development and find ways to incentivize their use.

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.

COMMUNITY TRANSPORTATION

Improve bicycle and pedestrian infrastructure - Build upon the Complete Streets guidance integrating on-street bicycle and pedestrian infrastructure improvements to City streets.

Integrated transportation system improvements - Build upon the City's Transportation Plan to implement several improvements of the transportation system including the creation of a downtown transit center, Park and Ride and Auto Intercept lots to capture cars before entering neighborhoods, and increased frequency of transit in corridors servicing downtown and auto intercept facilities.

Create a downtown Transportation Management Association (TMA) - Develop a downtown transportation management association that develops, and manages all employee transportation and parking programs, infrastructure, and related facilities. The goal of the TMA would be to improve cost-effective and convenient alternative transportation services while simultaneously reducing travel demand and traffic congestion, thus improving air quality.

COMMUNITY TRANSPORTATION

Price parking to maintain 85% utilization - Increase parking rates to market-based rates and to maintain an 85% parking utilization will better relate parking supply with demand, increase the likelihood of available spaces, reduce traffic congestion, improve air quality revenues for the City.

Develop infrastructure for fuel-efficient vehicles - This proposed action would develop infrastructure and incentives for fuel-efficient might include charging stations for electric and electric-hybrid vehicles and fueling stations for CNG and other alternative fuel vehicles.

Develop a Citywide Bike/Pedestrian Plan - This proposed action would build upon the City's North/South Bike Plan by taking a more look at the City's existing bike/pedestrian infrastructure and designing and implementing necessary improvements.

GOVERNMENT TRANSPORTATION

Develop a government alternative employee commuting program - Reduce government employee commuting miles by encouraging commute through emissions-free modes (telecommuting, walking, and biking), as well as less impactful modes (car pooling, ridesharing transit). It would also include incentives such as a parking cash-out program.

Develop a government vehicle retirement and replacement program - Retire 5% of the government's vehicle fleet and replacing 2 line-powered vehicles with hybrids; retire twelve vehicles and replace 62 gas-powered vehicles with hybrids over a five year period.

Develop a government vehicle sharing/fleet management program - Includes vehicle acquisition, assignment and maintenance with effectiveness and emissions reduction. Could also include other functions, such as vehicle financing, driver management, speed management, health and safety management, regulatory compliance, and validating green initiatives.

LOCAL GARDENS, FARMS AND FOOD PRODUCTION

Develop public-private partnerships and infrastructure to support processing, preserving and storage of locally produced food - Develop public-private partnerships and infrastructure for the processing, preserving and storage of locally produced foods.

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.

ENERGY EFFICIENCY IN BUILDINGS

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 the by requiring high efficiency heating and appliances.

Fully implement BED Advanced Metered Infrastructure (AMI) program - BED is in the process of installing smart meters in all buildings of Burlington. Smart meters will provide data to BED and its customers in 15 minute intervals, and offer two-way communication. This data can then be used to achieve increased efficiency.

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 30%.

ENERGY EFFICIENCY IN BUILDINGS

Implement the "PACE" Program for residential properties and explore expansion to commercial properties - The PACE program allows residential property owners to access long term municipal financing to make eligible energy efficiency and renewable energy improvements. By opting into a special tax assessment district, property owners pay for these improvements via property taxes over a period up to 20 years.

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, resulting in significant energy reductions.

Replace existing streetlights with LEDs - Continue to replace all existing streetlights (approximately 3,300) with LEDs over a 10-year period.

Create a Green Roof policy and incentive program - Create incentives to encourage that all new flat roofs at or under 30 degree-pitch and public have to be vegetated. If old roofs have to be retrofitted, the building owner may be able to receive public financial support.

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 audit and rating that is available to prospective buyers.

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.

RENEWABLE ENERGY RESOURCES

Study the feasibility of McNeil district heating project - Use McNeil power plant as a heat source for a district heating system that takes advantage of McNeil's efficiency, make use of some of its waste heat, and provide heat to consumers at a relatively low and predictable price.

Implement additional "Solar on Schools" projects - Put solar PV panels on the City of Burlington schools' roofs. The panels on several schools are currently owned and operated by a private third-party development partner who can take advantage of federal and state tax credits, which the City can leverage.

Implement BED "Renewable Energy Resource Rider" program - Encourage residents and businesses to install solar PV panels. This can be achieved through setting a predictable and stable rate above the retail cost of electricity, and therefore above the rate for standard net metered systems.

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.

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.

URBAN FORESTRY AND CARBON SEQUESTRATION

Increase the Urban Tree Canopy (UTC) - This proposed action would increase the urban tree canopy (UTC) by planting a total of 588 trees and by maintaining the existing urban tree canopy. This would be achieved both on public and private property.

WASTE REDUCTION AND RECYCLING

Implement residential organics collection program - Collect residential organic food waste (no yard waste) to be composted and windrowed after the existing City residential recycling program, thus having a similar infrastructure and cost profile.

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 system would remain the same.

Require recycling bins at all public facilities and events - Require that recycling bins are available and maintained at all public facilities and events.

Increase the use of reusable shopping bags - Create incentives for increase usage of reusable shopping bags and the complementary use of reusable plastic bags.

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.

Require all major construction and demolition projects to submit a waste management plan - Require construction and demolition projects to submit a waste management plan. Such a plan would include: waste recycling, salvage or reuse goals; estimated types and quantities of 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.

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