

VIII. ENERGY PLAN

Vision Statement

This Plan envisions Burlington as a city where...

...Burlington is a leader in the development and implementation of energy efficiency and renewable energy measures that reduce energy costs, enhance environmental quality, improve security and sustainability, and enhance economic vitality. Key elements of this success are a broad range of energy efficiency programs, public education in resource conservation, publicly-owned alternatively-fueled electric generation, biomass-fueled district energy technologies, energy-efficient green building technologies, and climate-friendly transportation solutions, which includes support for alternative fueled vehicles.

CITY POLICIES

THE CITY OF BURLINGTON WILL:

- **Optimize overall energy efficiency, reduce energy requirements, and minimize the need for new energy resources on a citywide basis.**
- **Continue to aggressively pursue the transition to renewable sources, cogeneration, and district heating.**
- **Improve the energy efficiency of city-owned buildings and facilities.**
- **Reduce transportation energy use by lessening reliance on drive-alone car trips, using more fuel-efficient vehicles, promoting increased transit use, and decreasing vehicle miles traveled.**
- **Educate its citizens regarding energy efficiency, the benefits of public utility ownership, renewable electric generation, and conservation to ensure that citywide resource allocation decisions in years to come will reflect the wishes of an informed citizenry.**
- **Make tangible efforts to reduce greenhouse gas emissions through the implementation of the *Climate Action Plan*.**

INTRODUCTION

Access to reliable and clean energy, at an affordable price, will be an important factor in defining and facilitating future growth and development in Burlington. This Chapter briefly outlines how energy is used and supplied to the city, discusses some of the most important public policy issues related to energy generation and consumption, and finally proposes a series of strategies to improve efficiency, protect the consumer and the environment, and maintain energy self sufficiency. Much of the information and policy direction for this section comes from *The Burlington Climate Action Plan*¹ adopted by the City Council in the late spring of 2000, and included as part of this plan by reference.

Energy Use & Supply

Nearly two-thirds of city residents rely on natural gas for residential use, and this is projected to increase in the near term. In 1989, approximately 23 percent of the non-transportation energy used, or 51 percent of the dollars spent, in homes came from electricity. Since that time, through the efforts of local demand-side management programs, residential electric heat has been reduced dramatically down to 2% of homes. Rather than raising electric rates, Burlington's ratepayers saw a 5.03 percent decrease in 1996.

Statewide energy use among fuels shows the dominance of oil in our energy consumption. Oil consumption is projected to increase 52% between 1990 and 2015. Use of other fuels (electricity, natural gas, and LPG) is also expected to increase, but their total usage is small compared to oil. Vermont Gas, a private company, provides natural gas to most of the city, except those areas where low demand, topography, or subsurface conditions make laying pipeline difficult.

Electricity is a high-quality power source, but to date has been inappropriate for space and hot water heating due to historically higher costs. Natural gas is a more suitable heat source. If gas and other fossil fuels prices continue their steady escalation however, this policy will need re-examination, particularly given associated greenhouse gas emissions. Although Vermont uses more hydroelectric power and wood energy than many other states, our total use of renewable energy sources is much smaller than our use of non-renewables. Use of renewables is not growing as fast as our use of non-renewables statewide.

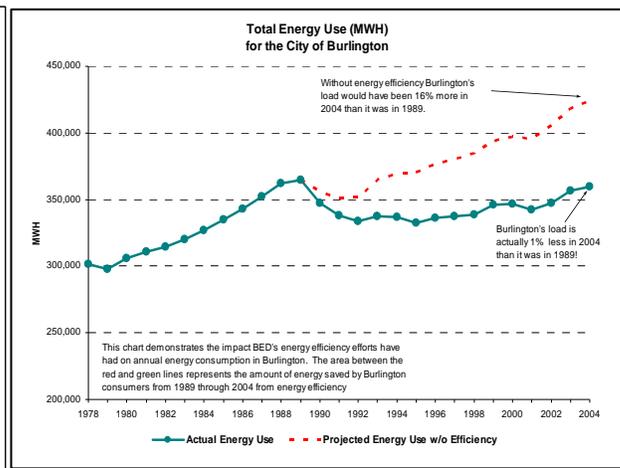
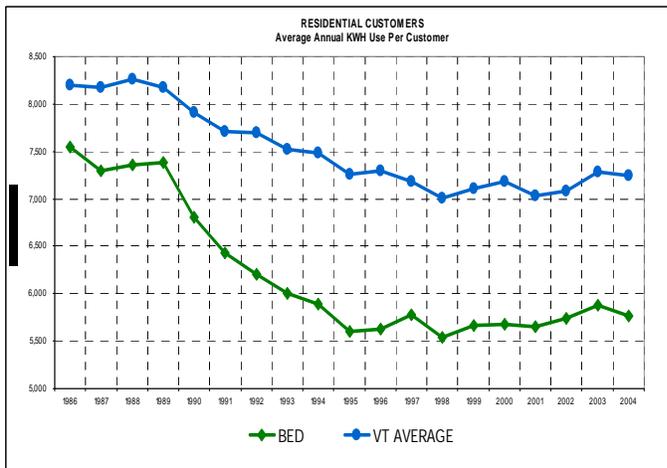
Burlington's energy use priorities focus on developing more effective and economically viable renewable energy alternatives including wind and solar energy sources, and a continued emphasis on conservation and efficiency programs aimed at both the end user and commercial producer.

¹ *The Climate Action Plan: A Plan to Save Energy and Reduce Greenhouse Gas Emissions*. Climate Protection Task Force. Burlington, Vermont. February 2000.

BURLINGTON ELECTRIC

Burlington is fortunate to have a municipally-owned and operated electric company. Burlington Electric (BED) began in 1905, and currently serves about 16,000 residential customers and more than 3,600 commercial customers. BED serves the full range of energy services including generation, transmission, distribution, and other retail energy services.

Burlington is a recognized world leader in the use of renewable energy and energy conservation. In 2004, Burlington as a whole used the same amount of electricity it used in 1989 – about 435,000 megawatts.



BED owns 50% of the 52-megawatt (MW) McNeil Generating Plant located in the Intervale. McNeil Station is one of the world's largest woodchip-fueled electric generating facilities, and is part of an experimental biomass gasification demonstration project started in 1997. During fiscal year 1999, McNeil Station produced 183,109,400 kwh of power while consuming 270,848 tons of wood chips. This represented a significant increase over recent years as McNeil Station is increasingly called upon to provide voltage support and transmission stability to the New England Power Grid. BED will continue to monitor fugitive dust in the area of McNeil Station that has been an issue for nearby residents, and continue to take the necessary steps to minimize emissions.



Land adjacent to McNeil Station remains undeveloped, and BED has expressed interest in its use for other innovative energy-related uses. This is the proposed as the future home of “Riverside Eco-Park” which is envisioned as a 60,000 sq.ft. greenhouse and business complex that utilizes thermal energy generated at nearby McNeil Station.

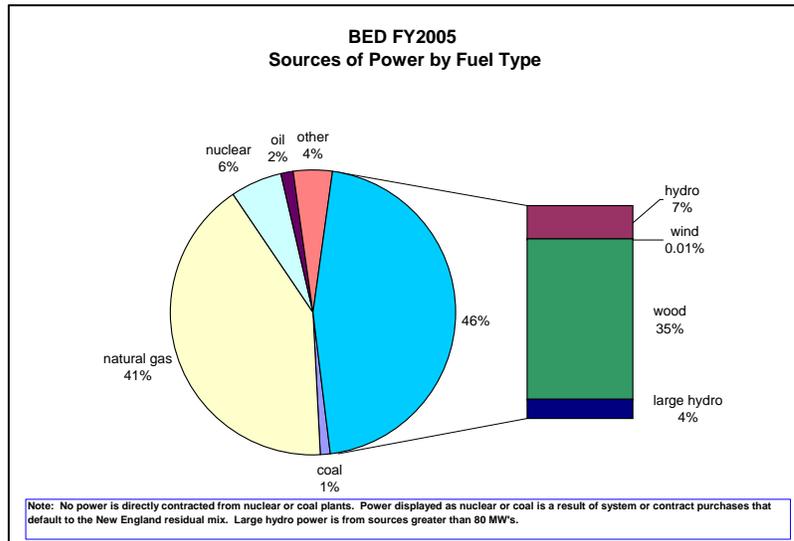
In addition, BED owns a 25-MW turbine located next to the Water Treatment Plant on Lake Street. The gas turbine is capable of bringing the entire city on-line, including the McNeil Station, in less than 30 minutes from a cold start. BED is also capturing methane

gas at the former city landfill north of Manhattan Drive to generate about 0.5-MW of power.

BED continues to seek other power supply options including local generation. BED is currently researching the viability of a locally-developed wind power facility. It is collaborating on the Chase Mill Hydro Project on the Winooski River between Burlington and Winooski which now delivers BED 1.3-MW of power. Maintaining this local energy self-sufficiency is an important component to Burlington’s future sustainability.

In addition to its own generation facilities, BED purchases power from a variety of sources through the New England Power Grid. Approximately 46% of this power comes from renewable sources and this percentage is expected to continue to grow. In

determining where to purchase energy, BED considers the total social and environmental costs as well as the out-of-pocket ones. For example, when one considers the difficulty and costs of nuclear waste disposal, Vermont Yankee may prove to be a more expensive alternative than other sources. In part, Burlington chose not to purchase power from Hydro-Quebec for these



types of reasons. BED also will need to carefully scrutinize its generation expansion proposals in light of utility de-regulation and the success of demand reduction strategies. If new generation alternatives are pursued, careful consideration must be given to effects on the natural and built environments of the city.

District Heating & Cooling/ Community Energy

BED, in conjunction with the Department of Public Works, continues to study the feasibility of developing district heating and cooling, or now known as “Community Energy,” within portions of the city. Areas under evaluation begin with the institutions on the Hill (UVM and FAHC), but could later include the City Center and Waterfront. Although not under consideration at this time, the concentration of industrial land uses along Pine Street may make this area another attractive location to provide this type of service.

The concept for Community Energy is to replace natural gas and fuel oil as heat sources with hot water. Such a plan will utilize excess city water capacity, combined with energy and excess heat produced by McNeil Station, with an expansion to possibly include a small gas turbine in a later phase. Energy would be distributed underground to either heat or cool buildings within the district. If feasible, district heating and cooling is expected to provide a viable energy alternative, make use of existing water capacity, diversify the city's energy mix, and make the city a more attractive and competitive location for business.

Energy Efficiency Programs

With the support of Burlington residents in the form of a \$11.3 million bond, BED began an ambitious energy efficiency program in 1990. Over \$26 million has been invested by BED since 1991 with half of this coming from matching from the customers. BED has implemented a wide range of programs to reduce overall energy consumption and costs through the city. These included:

- **Smartlight:** leases compact florescent energy saving light bulbs to consumers.
- **Neighbor\$ave:** offers household energy audits of all energy consumed, compact florescent light bulbs, and installs water and energy savings measures for electric water heater customers. This program will be BED's vehicle to promote the "10% Challenge Campaign" portion of the *Climate Action Plan*.
- **Heat Exchange:** offers assistance and financial subsidies to convert customers from electric heating to other heating sources.
- **Top 10:** offers a customized menu of energy savings opportunities to the City's largest electrical customers to provide "positive cash flow" financing of demand-side management measures. This program will also carry forward the commitments customers have made to the Climate-Wise Program and the "10% Challenge Campaign."
- **Energy Advantage:** offers "positive cash flow" financing to deliver retrofit energy savings measures to small to medium-sized businesses.
- **Energy-Efficiency Guidelines:** adoption of minimum standards for buildings and energy-consuming equipment in new construction and rehabilitation projects.
- **Construction and Equipment Replacement:** provides technical assistance and customized incentives for reducing energy demand beyond the Energy Efficiency Guidelines.

The Future under De-Regulation

BED is participating in discussions at the federal and state level concerning de-regulation of the electric industry and the introduction of competition. The discussion centers primarily on the deregulation of the generation component of the industry, and the introduction of competition, or choice, for the retail customer. While this discussion has

recently lost momentum nationally, restructuring has been implemented in a number of states, and several legislative and regulatory efforts have been explored in Vermont since 1995.

While changes of this magnitude may offer unforeseen opportunities, several issues must be considered. These primarily include environmental impacts associated with energy sources, protection of low-income consumers, and continued support for research and development. BED has been a leader in environmental protection, efficiency and renewable energy resources, and addressing the needs of low-income consumers. Local ownership and control has been essential to realizing these objectives as well as achieving stable (and falling) electric rates since 1993. Any final solution to industry de-regulation must also address growing concerns over the vulnerability of the regional power grid to ensure a continuous supply of power at reasonable and stable rates. Additionally, maintenance of transmission corridors must be continued by trained foresters and arborists to minimize disruptions and protect vegetation within the rights-of-way.

BED and the VT Public Service Board should continue to investigate and advocate for opportunities to maintain local jurisdiction in the event the restructuring discussion regains momentum. , the use of exit fees to discourage or at least compensate for the potential loss of large customers, and support for environmental protection and renewable energy resource programs.

Energy Use and Climate Protection

Most climatic scientists now agree that human-caused emissions of greenhouse gases² are having a measurable impact on the earth's climate. While increases in global temperatures are highlighted as one of the primary outcomes of climate change, many impacts that are more serious may result. These include an increase in the frequency and intensity of extreme weather events, rising sea levels, and a northward expansion in the range of tropical diseases and pests. Each poses a significant economic and environmental threat to our region and beyond.

In 1996, the Burlington City Council agreed to participate in the "Cities for Climate Protection" campaign organized by the International Council for Local Environmental Initiatives (ICLEI). In 1998, the Council adopted a resolution that set a target of 2005 for reducing local greenhouse gas emissions by 10 percent below 1990 levels, and established the Climate Protection Task Force.



² "Greenhouse Gases" are any gas found in the earth's atmosphere that contributes to trapping energy under the atmosphere and causing warming. Such gases include carbon dioxide, methane, ozone, nitrous oxide, chlorofluorocarbons (CFC's) and water vapor.

The largest source of greenhouse gas emissions in Burlington is carbon dioxide resulting from the combustion of fossil fuels. Burlington's estimated CO₂ emissions were 509,000 tons in 1990, and 624,000 in 1997 - or 13 and 16 tons per person respectively. In order to meet the City Council's target, CO₂ emissions would have to be reduced by 257,000 tons.

In the spring of 2000, the City Council adopted the *Burlington Climate Action Plan* which recommends a more achievable reduction goal 156,000 tons – or 10 percent below 1997 levels. Burlington's *Climate Action Plan* seeks to:

- Raise awareness about individual and business actions that can reduce the threat of global climate change.
- Guide decision-makers in Burlington towards policies, strategies, and actions that can cut greenhouse gas emissions.

Recommended actions propose to reduce traffic and air pollution, save money for the City and its residents and businesses, and help protect the environment for future generations. Examples of strategies in the plan include:

- Retrofit city buildings and revise operations to make municipal operations more energy efficient and climate friendly. Including an increase in the use of energy efficient and alternative fueled vehicles as part of the city fleet; Expand and maintain the City's inventory of street trees and shrubs; and creation of a telecommute policy and program for employees to work from home.
- Encourage residences and businesses to invest in energy efficiency and renewable energy; Fully implement existing utility sponsored efficiency programs (electric and natural gas) in the commercial and industrial sectors; Fully implement existing utility sponsored efficiency programs (electric, natural gas, weatherization) in the residential sector; Implement a "10% Challenge Campaign" to enlist the support of all energy consumers in reducing greenhouse gas production; and Support the establishment of the efficiency utility.
- Implement policies and planning to reduce transportation demand and to encourage more fuel-efficient and alternative fueled vehicles; Continue implementation of existing TDM programs including park and ride lots, shuttles and rideshare programs; and develop park and ride lots and shuttle services that link and connect to employment centers.
- Support the development of a biomass district heating system; Support ongoing R&D of new technologies including bio-gasification and fuel cells; and Address the barriers to developing a district energy system that uses the rejected heat of the McNeil Electric Generating Plant to supply the energy needs of the Greater Burlington area customers including: UVM, FAHC, downtown, the waterfront and Winooski.

In addition to reducing greenhouse gas emissions, the recommendations of this Plan will benefit the city in other ways:

- **Cleaner air:** Motor vehicles are the single largest source of urban air pollution. In addition to greenhouse gases, cars emit such carcinogens as butadiene, benzene, and formaldehyde.

- **Improved human health:** Cleaner air will result in healthier people. An estimated 40,000 premature deaths nationally are attributed to motor vehicle emissions.
- **Improved economic vitality:** Improvements in energy efficiency mean tangible cost savings to individuals and businesses. Energy independence keeps local dollars in the local economy and improves the competitiveness of local businesses.
- **A more liveable community:** A city with less traffic, cleaner air, more trees, and successful businesses will be a more attractive and liveable place to live for current and future generations.

Energy Action Plan

Action Item	Lead Agency	Secondary Agencies
Analyze the potential of operating city-owned vehicles on alternative fuels and periodically review the analysis to consider changing conditions and opportunities.	Public Works	BED
Sponsor forums for architects, developers, contractors, and others to inform them about new city ordinances, regulations, and standards and to provide technical assistance as to how they can incorporate new analytic and production techniques in their work	BED	Public Works
Review vocational curricula to promote energy efficiency and to develop programs to prepare students for employment in new energy-related fields.	BED	Schools
Establish an energy district if justified by the positive result of BED's feasibility study of district heating and cooling.	BED	Public Works
Revise the Energy Efficiency Ordinance for new construction to integrate new technologies.	BED	Public Works
Develop an overall energy budget to manage the city's energy consumption. For electricity, the budget should be based upon local generating capacity.	BED	
Examine the costs and benefits of requiring new development to either pay an energy impact fee or make an offsetting investment in efficiency.	BED	Planning & Zoning

Prepare an evaluation of the citywide potential, constraints and impacts associated with the development of new renewable energy sources - including fuel cell, cogeneration, biomass, solar, geothermal, hydro, wind, and methane.	BED	
Develop guidelines for tree heights and species selection that maximize energy efficiency.	Parks & Recreation	BED
Increase use of energy efficient maintenance vehicles and City fleets.	Public Works	BED
Explore and develop climate friendly procurement and purchasing guidelines.	Treasurer's Office	BED
Amend and enforce the municipal code and ordinances with an eye on reducing CO2 loads.	Planning & Zoning	BED
Explore a telecommute policy and program for selected employees to work from home.	Human Resources	
Develop a comprehensive education/outreach program to increase public awareness about the affects of global climate change on public health, the economy and the environment.	BED	Planning & Zoning Public Works
Expand and maintain the City's inventory of street trees and shrubs.	Parks & Recreation	
Fully implement existing utility sponsored efficiency programs (electric and natural gas) in the commercial and industrial sectors.	BED	
Fully implement existing utility sponsored efficiency programs (electric, natural gas, weatherization) in the residential sector	BED	
Increase energy efficiency in municipal-owned and leased buildings.	Treasurer's Office	BED Public Works Schools
Explore and to obtain the resources necessary to implement the objectives of the municipal buildings and operations plan.	Treasurer's Office	BED Public Works Schools

