



PERFORMANCE MEASURES REPORT 2016





YEAR IN REVIEW

BURLINGTON ELECTRIC DEPARTMENT Neale F. Lunderville, General Manager

The Burlington Electric Department (BED) is pleased to present the 2016 Performance Measures Report. BED presents this annual report to help achieve organizational goals and shares the findings for the benefit of our customers and the Burlington City Council.

In 2016, BED built upon the success of its departmental reorganization and began implementing a new strategic plan designed to position BED to meet the changing demands of a dynamic energy sector and to become a “utility of the future.”

BED’s mission is to serve the energy needs of our customers in a safe, reliable, affordable, and socially responsible manner. The new strategic plan sets forth a bold 10-year **vision to transition Burlington to a “net zero energy city”** across electric, thermal, and transportation

sectors by reducing demand, realizing efficiency gains, and expanding local renewable generation, while increasing system resilience. Net zero means producing or sourcing as much renewable energy as we consume.

BED’s energy efficiency programs will continue to play a major role in getting Burlington to net zero. BED already has begun this effort by offering Passive House and net zero building training to designers and builders. BED is working with partners from three new construction projects considering net zero design. Further, in partnership with Vermont Gas Systems, BED launched energyChamp for residential customers, allowing them to take power over their energy use with a new and easy-to-use website – energyChamp.org – designed to help customers visualize and understand



their electric and thermal energy use in general terms, affordably improve their efficiency, and protect the planet.

Burlington's achievement as the first city in the country to source 100% of its power from renewable generation continues to garner international recognition. BED had been working toward this goal for more than a decade and reached this extraordinary milestone with the purchase of the Winooski One Hydroelectric Facility in September

its campus buildings, and BED has signed a contract for a 2.5-megawatt solar array located in Burlington, expected to become operational in summer 2017. BED began receiving power under a new 10-year wind contract in December 2016 and is looking to further diversify its hydro contracts.

Energy innovation is at the heart of BED's strategic plan. BED has continued to add to its electric vehicle (EV) charging network and has submitted a grant proposal to

Burlington is on a path toward becoming a net zero energy city.

2014. Importantly, none of BED's primary energy producing resources – biomass, hydro, wind, solar – relies on fossil fuels and, therefore, BED is well-insulated from sudden and unpredictable swings in the energy market.

BED continues to push forward along its renewability path, having commissioned several solar projects that it now owns. In 2016, BED supported the University of Vermont in its effort to install solar panels on a number of

evaluate the economics of offering reduced rates at these EV charging stations in return for the ability to interrupt charging at peak periods. In the summer of 2017, BED plans to offer a pilot voluntary peak reduction program to test customer willingness to reduce loads on key days.

Finally, BED soon will deploy a small sample of advanced (prototype) water heater load control devices to allow BED to modify the consumption patterns of electric



water heaters without affecting the customer's comfort.

In September 2016, Mayor Miro Weinberger and BED announced the formation of a unique City partnership with Vermont Gas Systems, the Burlington Town Center, the University of Vermont Medical Center, the University of Vermont, and the Burlington District Energy System citizens' group to explore the potential of **creating a district energy system** that likely would begin in the downtown and expand to include capturing waste heat from BED's McNeil Generating Station. The goal of establishing a district energy system in Burlington has eluded the City for many years and has the potential to bring

significant savings and long-term energy stability to Burlington's major employers. Reaching this goal would be a significant milestone on our journey toward a more sustainable energy future.

Citing BED's forward-looking financial policies, diverse and renewable power supply, competitive rates, and strong and focused management as important factors, Moody's Investors Service in December 2016 **upgraded BED's credit rating to A3** from Baa1, representing the first time in more than six years that BED has earned an "A" rating. This increase followed an increase to Baa1 from Baa2 in November 2015.

BED is proud to serve Burlington

and will continue to be responsive to the community. This report is intended to help explain what we do and to help us measure our progress over time. We invite your comments and suggestions by [clicking here](#).

We have created this report as an electronic download available on our website, rather than in print form, saving many trees and \$1,500 in printing costs.

2016 SERVICE QUALITY & RELIABILITY

100%

Customer requested work completed by promised delivery date

0%

Customer bills found inaccurate

0%

Customer bills estimated

Target

2.1

Actual

0.6

Average number of customer interruptions

Target

1.2

Actual

1.0

Average hours of customer interruption

Target

<3.5

Actual

1.0

Lost time incidents

Target

<71

Actual

4.9

Lost time severity rate

*From Service Quality and Reliability Plan (SQRP) submitted quarterly to the Vermont Department of Public Service



ABOUT BED

Delivering public power to Burlington since 1905

Burlington Electric Department (BED) is a department of City government and an essential part of Burlington's infrastructure. BED is Vermont's largest municipally owned electric utility serving more than 20,000 customers. BED is the exclusive provider of electric service to the City of Burlington, an area of approximately 16 square miles, and the Burlington International Airport in South Burlington.

As a municipal utility, BED is an expression of the community's commitment to **not-for-profit rates, local control, and sustainability**.

A public power utility offers customers the right to participate directly in the most important decisions about the future of the utility. Such participation demonstrates

the importance of community-based decisions about our energy future because they reflect local values such as renewable energy and a drive toward a net zero energy city.

BED is a recognized national leader in green energy with the recent milestone achievement of sourcing 100% of our power from renewable generation. With a focus on low and stable rates and a commitment to energy efficiency, BED's 20,000 customers use less power today than they did in 1989.

BED currently has approximately 115 full-time employees working between our Pine Street headquarters and the McNeil Generating Station in the Intervale. In addition to its 50% ownership share of the McNeil Station, BED owns and operates a fleet of generation including



Winooski One Hydroelectric Facility, a large solar array at the Airport, a roof-mounted solar array at the Pine Street offices, and a gas turbine facility for emergency power. BED also purchases power both in Vermont and regionally, including wind power from Georgia Mountain Community Wind, Vermont Wind in Sheffield, Hancock Wind in Maine,

With strong support from Mayor Miro Weinberger and the City Council, BED has entered contracts for the purchase of energy from renewable resources, and we have advanced initiatives to meet our net zero goals. These forward thinking decisions allow BED to provide stably-priced power to our customers and to lead through energy innovation.

Our customers used less electricity in 2016 than they did in 1989.

and hydroelectric power from small Vermont producers, as well as larger units in New York and Quebec.

BED has proudly operated its own energy efficiency programs since 1990, serving both residential and commercial customers with technologies and incentives to save money and use less energy. Even with advances in renewable energy, efficiency remains the foundation of our work to keep Burlington sustainable.

We thank our community members for their support of many ballot items over the years, including the revenue bond to acquire Winooski One – a key link to helping us to achieve our renewable generation goals – and votes to support strong energy efficiency measures and improve system reliability.



RATES & BILLS

The average Burlington residential customer paid \$371 less per year than the statewide average and lower than the average for every state in the region.

BED provides electric service to 16,806 residential customers and 3,849 commercial and industrial customers. For a variety of reasons, including a very large number of students, BED's turnover in residential accounts is more than 6,000 per year.

On the other hand, BED has two large customers that represent 29% of total sales. Commercial and industrial customers use much more electricity than residential customers and account for 53% of revenues.

Whether residential, commercial or industrial, BED customers expect and deserve certain fundamental services: reliable and safe electricity, exceptional customer service, and affordable bills. BED last raised its rates seven years ago, in 2009, and does not expect an increase in 2017.

Although rates are an important indicator, they tell only part of the story. A customer's bill reflects the rate times

the amount of electricity used. Thus, customers who are more efficient and use less power have lower bills.

Residential Customers

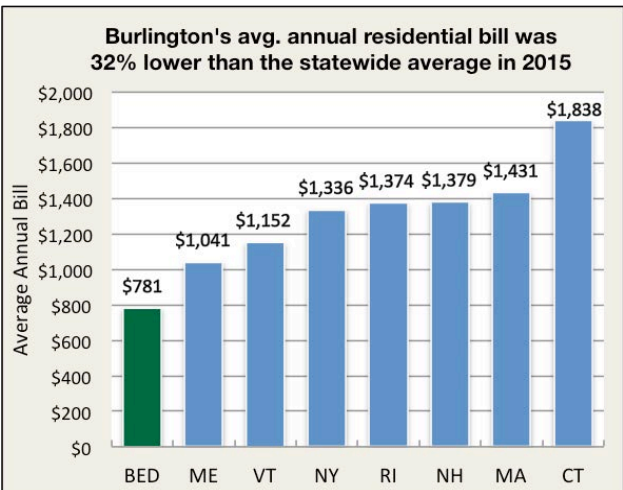
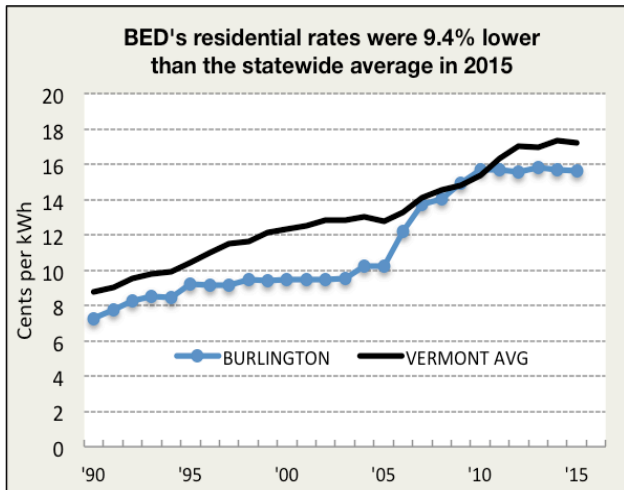
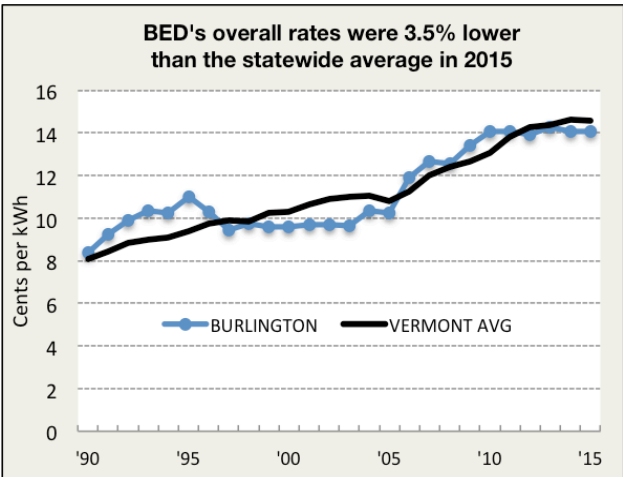
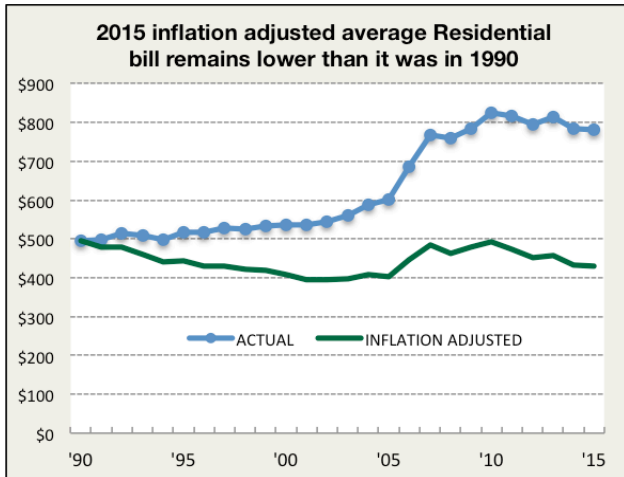
BED's residential rates were 9.4% lower than the statewide average in 2015. In addition to competitive rates, Burlington residents have managed their electric use through energy efficiency. The combination has produced relatively stable bills for Burlington residents over the years. Burlington's average residential bills were 32% less than the statewide average in 2015.

	Rate / kWh	Average Residential Bill
Burlington	15.64¢	\$781
Vermont	17.25¢	\$1,152

In 2015, an average Burlington residential customer paid \$371 less per year than the statewide average and lower than the average for every state in the region. Overall, this represented aggregate savings of \$6.2 million – money that could be saved or spent in the local economy. These savings also help lower housing costs, which is important in Burlington’s tight housing market. Some of the difference in usage and bills reflects the number of small rental units in Burlington.

The 2015 inflation-adjusted average annual residential bill was still lower than in 1990. This is especially noteworthy in contrast to the fluctuating costs of other energy sources. For example, according to the U.S. Department of Energy, the inflation-adjusted price of natural gas for residential customers in 2015 was 39% higher than in 1990.

Utilities have different rate designs that make comparisons difficult. The easiest way to measure performance is to compare average revenues per kilowatt-hour – total revenue divided by kWh sales. This is called “average rates” and is a standard measure for the price of electricity to the consumer. The most recent rate data from the Vermont Department of Public Service is for calendar year 2015.



Commercial & Industrial Customers

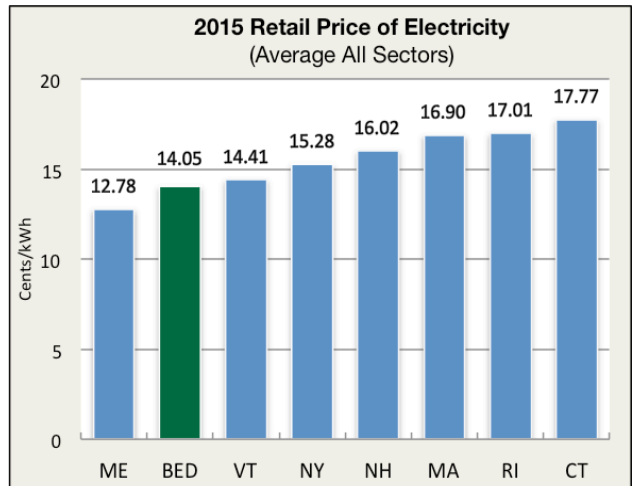
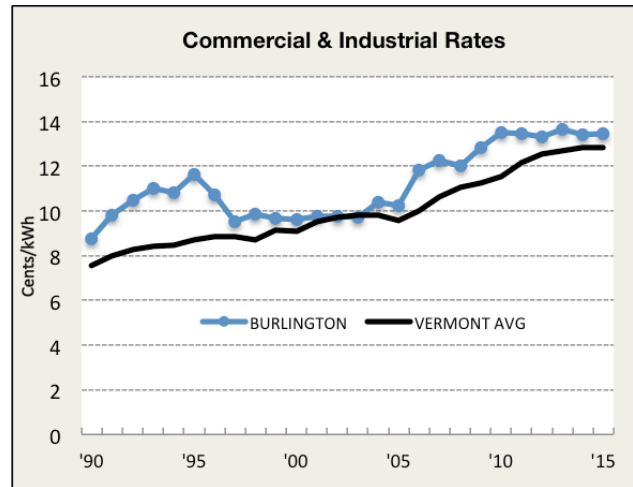
Commercial and industrial rates have not increased since 2009. Although BED's rates remain slightly higher than the statewide average, the gap has closed in recent years as rates from other utilities continue to rise.

As the long term contracts entered by BED in recent years have started to deliver energy, and we depend less on the New England spot markets, BED's average rates have stabilized.

In addition, BED made its final payment on the majority of its outstanding revenue bonds in 2014 (including those for the McNeil Plant). This will reduce costs and help stabilize rates going forward.

The bottom right graph shows a comparison of BED's overall rates with other New England states. To the extent electric rates are a real or perceived issue for economic development, Burlington is in good shape within the region.

In any case, rates are still only half the picture. Along with the efforts to reduce rates, BED's Energy Services staff has helped commercial and industrial customers reduce their consumption through energy efficiency initiatives.



BED IN THE COMMUNITY

In 2016, our employees participated in several community charity events, including the Lake Champlain Dragon Boat Festival races benefiting breast cancer survivors, the Spectrum Sleep Out, an annual bake sale on Town Meeting Day to benefit the United Way, Kids Day at Burlington's



Our BED team is proud to participate in these and other activities in an effort to give back to the community we love so much.



Waterfront Park, an Energy Efficiency Calendar Contest open to all Burlington 4th graders, and a toy drive for Operation Fire Cuffs, benefiting the University of Vermont Children's Hospital.

As part of United Way's "Live United" campaign, BED raised over \$12,000 from employees to support United Way charities.





www.energyChamp.org

Take power over your energy.

Understand your usage, improve your efficiency, and unlock special offers.

ENERGY EFFICIENCY

In 2016, BED customers purchased nearly 30,000 LED and compact fluorescent bulbs and fixtures, 85 high-efficiency washing machines, and nearly 100 high-efficiency refrigerators.

Altogether, BED has invested \$28.8 million in energy efficiency and has leveraged another \$30.4 million in private funds from our customers. Almost all of these dollars re-circulate in the local economy. The efficiency investments saved Burlington customers about \$11 million in 2016 alone.

Overall electricity use in 2015 was about 4.0% lower than in 1989. In other words, we are meeting the needs of a growing local economy with less electricity than we used a quarter century ago. During the same period, statewide use of electricity increased by 4.5%.

Further, efficiency investments help Burlington avoid the release of 24,000 tons of CO₂ annually, equivalent to removing 6,300 cars from the highways.

All customers pay for efficiency in their bills, so BED

has programs tailored for all rate classes. The graphs on the next page show the distribution of resources and savings for residential, commercial, and industrial customers.

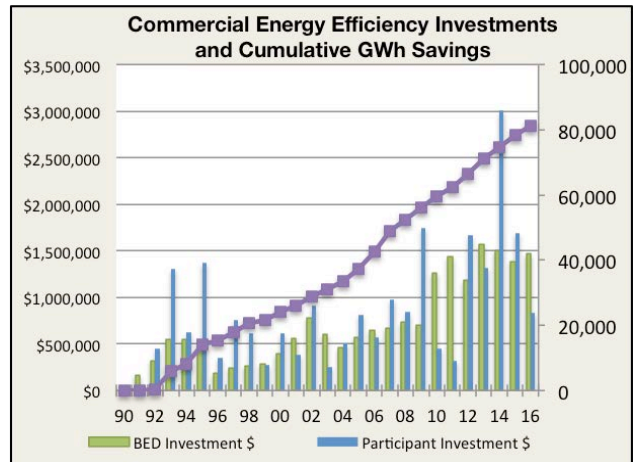
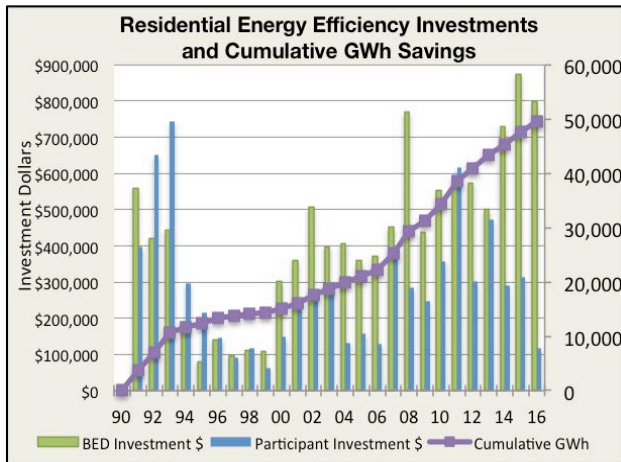
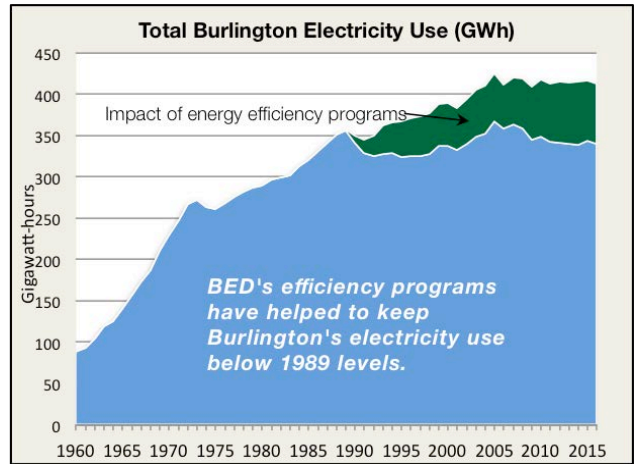
BED partners with Efficiency Vermont on the statewide retail products program. Customers receive rebates for buying Energy Star lighting and appliances at participating retailers. For example, in 2016, BED customers purchased nearly 30,000 LED and compact fluorescent bulbs and fixtures, 85 high-efficiency washing machines, and nearly 100 high-efficiency refrigerators.

BED, in partnership with Vermont Gas Systems, launched energyChamp.org, a one-stop website to help customers understand their electric and thermal energy use in general terms, affordably improve their efficiency, and protect the planet. The site went live in January 2017.

Energy Efficiency in the Community

BED's Energy Services staff worked with dozens of customers in 2016 to implement efficiency projects that save energy, enhance facilities, and improve competitiveness. Total estimated customer savings were \$802,000.

In 2016, BED's Energy Services staff worked successfully with many business customers to upgrade to LED lighting and to install high efficiency heating, cooling and ventilation equipment. BED, in partnership with Vermont Gas Systems, also worked closely with many residential and commercial new construction projects around the City. These buildings are considerably more energy efficient than Vermont's energy code requires.





POWER SUPPLY

Harnessing biomass, hydro, wind, and solar energy

BED's power supply reflects a number of considerations including cost, renewability, predictability and reliability, diversity, and other economic and environmental impacts. While cost is always critical, other factors influence purchase decisions. BED has succeeded in maintaining comparatively low and stable rates, while continuing our commitment to renewables and, to the extent possible, keeping money in Vermont by supporting Vermont-based renewable generation.

In 2015, Vermont enacted a renewable energy standard (RES). An RES is a requirement that utilities serving Vermont customers provide specific amounts of the energy that their customers use from renewable resources.

Beginning in 2017, Vermont's RES has three distinct

requirements to help the state's energy sector advance in its efforts to become powered by renewable energy sources. First, Vermont utilities will need to ensure that 55% of the energy they provide comes from existing renewable resources. Second, part of the 55% must come from new net metered or small renewable resources. Third, Vermont utilities will be required to look for ways to substitute electric energy for fossil fuels where it can be done in an economical manner, such as replacing gas cars with electric vehicles. The target percentages for all of these requirements increase periodically after 2017.

BED essentially has already met the full targets for providing existing renewable energy, i.e. the 75% level for existing renewable resources that will apply in 2032.



Likewise, based on its resource portfolio, BED filed a petition with the State Public Service Board documenting that, as of 2015, BED possessed, owned, and contracted renewable resources sufficient to meet 100% of its expected retail sales in 2017. In recognition of this achievement, BED was able to modify its targets for the second RES requirement that addresses new renewable resources. BED will accept new net metering resources, and retire the Renewable Energy Certificates (RECs) from

proposals for a battery storage microgrid project located at the Burlington International Airport and has signed a contract for 2.5 MW of solar PV (South Forty Solar) to be built in Burlington before summer 2017.

Beginning in 2004, BED's analyses of supply options have consistently found that renewable resources were the best course of action. However, such resources generally come at a premium price. To maintain stable rates, BED can sell the rights to the renewable aspects of the output

BED has succeeded in maintaining low and stable rates while continuing our commitment to renewable energy.

these resources, but has no specific volume target.

In December 2016, BED's most recent major resource acquisition, Hancock Wind in Maine, became operational and provides BED with a 13.5 MW entitlement to its energy for 10 years. BED is excited about this new resource and, further, about the fact that the energy prices under this contract do not increase over time. In a further effort to increase its renewable resource portfolio, BED is reviewing

from the McNeil Plant and other renewable resources such as wind, hydro, and solar projects in the form of RECs. BED participates as a seller and a buyer of RECs in the New England market and, importantly, once all transactions are accounted for BED's power is 100% renewable.

Of BED's calendar year 2015 purchases (the last full year settled with the New England Power Pool Generation Information System), 91% was sourced from renewable



resources before accounting for REC transactions. The drop from 95% in 2014 to 91% was due to a delay in the commissioning of several projects. The preliminary values for 2016 indicate that the percentage of energy from renewable resources has returned to more than 100%, a percentage that is expected to continue in 2017.

BED sold many of the RECs from McNeil and its wind and hydro resources. After accounting for the sale of RECs, 20% of BED's needs were met with renewable energy in 2015 before allowing for the REC purchasing activities discussed in the following paragraph. The RECs from these valuable sources were sold to reduce the rate impacts of

purchasing long-term renewable resources. The Burlington Electric Commission currently has approved the sale of RECs through fiscal year 2019 and continues to review the economics of selling RECs to control rates versus retaining the ability to claim renewability.

BED also buys RECs from some generators that have existed for many years and, therefore, command a lower price. By doing so, BED creates revenue from REC sales to keep rates lower, while still maintaining a renewable power supply and supporting the operations of these existing renewable resources. After accounting for all REC transactions, including both REC sales and purchases, BED's supply portfolio

was served 100% from renewable resources. In fact, for 2015, BED retired RECs in excess of its energy needs and expects to do so again for 2016.

Integrated Resource Plan

In late 2015, BED initiated the next round of its Integrated Resource Plan (IRP) process. BED's last two IRPs were finalized in 2004 and 2008, and this iteration of the process was filed in January 2017. With BED's energy needs largely met, the focus of this IRP was on emerging technologies. Customers are encouraged to visit <http://www.burlingtonelectric.com/irp> where results from this process have been posted.

McNEIL STRONG FOR 33 YEARS

Located in Burlington's Intervale, the McNeil Generating Station is managed and operated by BED under a joint ownership agreement with Green Mountain Power and Vermont Public Power Supply Authority. Commissioned in 1984, the 50 MW biomass plant is Vermont's largest generator of electricity.



McNeil Generating Station

In calendar year 2016, McNeil Station produced 305,904 MWH of power and the plant had a 69.7% capacity factor.

In addition to power, McNeil produced 305,904 Connecticut Class 1 RECs.

McNeil's wood harvesting standards are comprehensive, field-proven means to harvest biomass fuel sustainably, and have been used as a model in developing forest management certification criteria. McNeil is net neutral from a carbon perspective. In 2016, McNeil Station used 457,272 tons of wood: 92% harvest residue; 6% sawmill residue; and 2% clean waste wood. McNeil foresters plan and monitor harvests on more



than 5,000 acres per year within a 100-mile radius of Burlington.

Harvest plans include protecting critical habitats and wetlands by employing the following measures: McNeil foresters encourage the use of low impact harvesting equipment on sensitive sites; and McNeil manages its wood fuel inventory to minimize delivery disruptions during inclement weather and to avoid environmental impacts of harvesting during sensitive times of the year.

McNeil continues to operate the Burlington Waste Wood Yard, which provides customers with a location to dispose of clean waste wood at no charge. In 2016, McNeil received 3,535 tons of waste wood which saved McNeil \$98,980 in fuel costs.

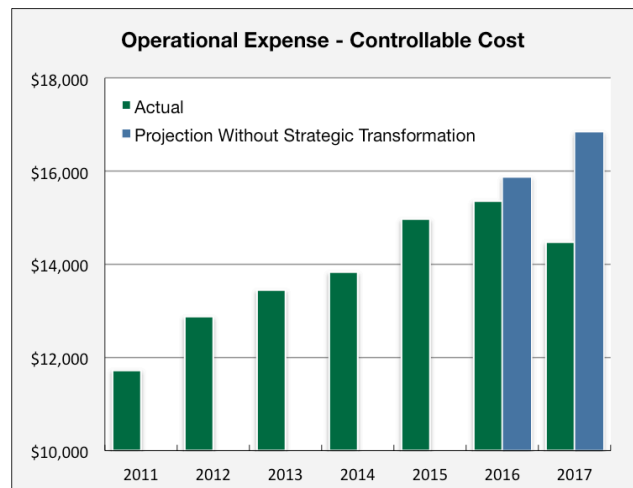
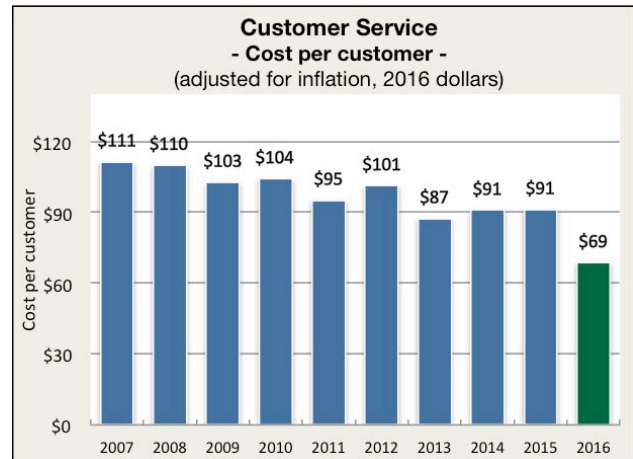
KEEPING COSTS LOW

Since 2015, BED has been undergoing a strategic transformation as part of the transition to “Utility 2.0”. These efforts have included a voluntary buyout and reorganization, which reduced employee head count from 133 to less than 120, as well as a bottom-up management review to update and streamline policies, processes, and procedures to lower costs.

In 2016, BED signed a four-year contract with its employee union, International Brotherhood of Electrical Workers Local 300, which ensures competitive pay for employees, while managing labor costs for BED.

Despite market pressures, BED has stabilized costs and not sought a rate increase since 2009. Adjusted for inflation, the cost per customer has declined 15% since 2005. Among other things, this reflects considerable savings from consolidating job functions and the productivity of our staff.

Adjusted for inflation, the average cost of maintaining the distribution system is \$1.7 million a year. In addition, BED makes long-term investments to improve the system, to extend its useful life, and to accommodate new development. Capital projects include equipment upgrades, line extensions, and new underground conduits and cables.



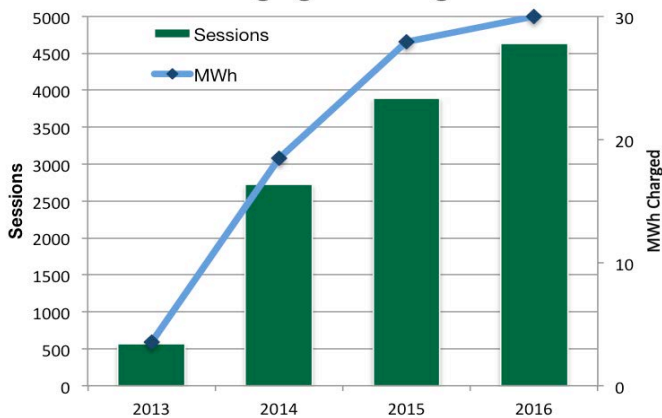
GIVING BACK

As a municipal entity, BED is not required to pay property taxes. However, BED makes an annual payment in lieu of taxes (PILOT) that makes us the largest property taxpayer in the City. We collect a 3.5% franchise fee for the City.

This is significant because these payments come from all customers. This is a more equitable distribution to finance City operations and is an important benefit of public power.

Fiscal Year	Payment in Lieu of Taxes	City Franchise Fees	Totals
2012	\$1,645,920	\$1,646,997	\$3,292,917
2013	\$1,770,701	\$1,637,827	\$3,408,528
2014	\$1,872,967	\$1,659,807	\$3,532,774
2015	\$1,950,434	\$1,648,148	\$3,598,582
2016	\$2,186,381	\$1,640,470	\$3,826,851
5 Yr. Totals	\$9,426,403	\$8,233,249	\$17,659,652

EV Charging in Burlington



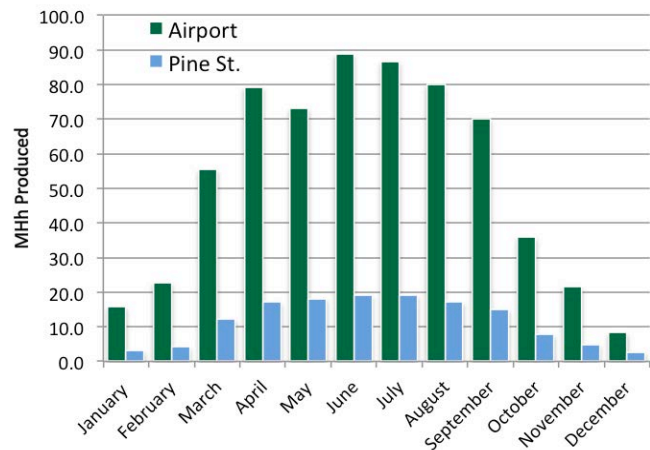
PLUGGED IN

After our first electric vehicle (EV) charging station came online in May 2013, BED has not looked back. Since then, we have added 13 stations for a combined total of 24 ports available for charging. In 2016, we added stations at the University of Vermont and Champlain College, as well as a station at the Hannaford supermarket in the New North End.

SUN'S OUT

Between BED's solar array at the Burlington International Airport and the array at the Pine Street offices, we produced 778 MWh of electricity for our customers. By harnessing the power of the sun, BED produced energy when we need it the most: in the summer. BED is a summer-peaking utility, meaning that our largest loads are during summer months. Solar helps ease the load.

2016 BED-Owned Solar Production





**BURLINGTON
ELECTRIC
DEPARTMENT**

BURLINGTON ELECTRIC COMMISSION
Gabrielle Stebbins, Chair – Scott Moody, Vice Chair
Sabina Haskell – Robert Herendeen – Tim Perrin

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