BURLINGTON ELECTRIC DEPARTMENT

2022 Energy Efficiency Utility Annual Report

(2021 DPS Measurement & Verification results are applied to 2021 savings, and prospectively to 2022 heat pump measures)

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Burlington Electric Department
585 Pine Street • Burlington, VT 05401
Phone 802.865.7300

Table of Contents

List of Tables

List of Figures

1 Introduction

The Burlington Electric Department (BED) is pleased to submit the following report to the Burlington Electric Commission, the Vermont Public Utility Commission (PUC), and the Vermont Department of Public Service (DPS), summarizing the implementation of energy efficiency programs in the City of Burlington for the year 2022. BED remains committed to offering its customers high quality and affordable energy services and a secure, environmentally sound supply of electricity into the future. Energy efficiency continues to play a significant role in achieving this goal.

Energy efficiency has been clearly shown to be Vermont's least expensive future energy supply resource over time and is every day a greater environmental imperative. BED is owned by all the citizens of Burlington, who have been very supportive of BED's pursuit of additional cost-effective energy efficiency.

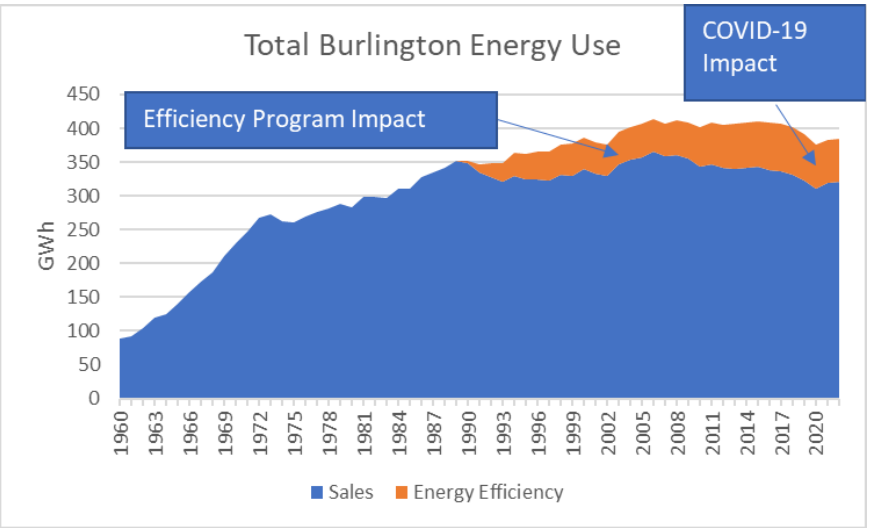
Burlington voters in 1990 approved an 11.3-million-dollar bond to fund energy efficiency programs that supported successful program activities through 2002. Since 2003, BED customers (like all other Vermont electric customers) pay a small monthly charge that supports these "Energy Efficiency Utility" (EEU) programs. When these funding sources are considered along with customers' direct investment, about $83 million has been invested in energy efficiency efforts sponsored by BED over the last 33 years. This is comprised of about $43 million spent by BED on all of its energy efficiency efforts during that period, combined with another $40 million in matching expenditures by its customers. The willingness to invest their private funds in these investments is a testament to the value that BED customers place on these services. Energy efficiency investments in Burlington are saving our customers approximately $10 million annually on electric bills, including avoided energy and transmission and capacity costs.

As Figure 1 indicates, the overall effect has been dramatic. Energy Efficiency has flattened BED's energy load requirement since the 1990's. As of year-end 2022, electricity consumption in Burlington is approximately 8% lower today than in 1989 when adjusted to remove COVID-19 impacts. Actual electric consumption in 2022 was

about 12% lower than in 1989, when including COVID-19 impacts. From 1989-2018, statewide electric consumption increased more than 10%. Over same period, U.S. electric consumption increased more than 30%. In other words, we are meeting the needs of a growing local economy with less electricity than we used over a quarter century ago. The consistent delivery of affordable energy efficiency services has helped to meet the needs of a growing local economy over the last 33 years with less electricity than was used then.

Energy efficiency expenditures are made almost entirely locally, typically in the form of professional services, skilled trades employment, and equipment purchases. Not only is the value of the City's building and energy-using equipment improved, but locally retained dollars are "multiplied" many times over by subsequent consumer spending. Absent these energy efficiency expenditures, these funds would have gone toward the purchase of electricity and enhanced infrastructure to satisfy increased demands on the City's electrical system. Most of these dollars would have been exported out of state, and many out of the country. Energy efficiency is a win-win situation for the city of Burlington through increased local economic activity, and through the avoidance of increasingly costly electricity purchases.

Figure 1: Impact of DSM on Total City Electricity Sales



Program Annual Performance Trends- Annual fluctuations in any energy efficiency program's performance depend on a variety of human and business cycle dimensions

that are hard to quantify and even harder to predict with precision. The decision to move forward with an energy efficiency project is ultimately the individual customers. Customers consider a wide variety of factors in their decision-making process, including their perceptions of local and national economic conditions and trends, their availability of funds and competing interests for the use of those funds, fluctuations in their business functions and volumes, and the opinion of off-site consultants and decision makers. Given the relatively small size of BED's system, the loss of only a few commercial new construction projects, for example, can have a dramatic impact on its annual budgets and savings estimates.

Year-to-year fluctuations in program results reflect the relative unpredictability of energy efficiency program timing and support the notion that *annual* projections are no more than carefully crafted estimates. In the long run, the performance of BED's energy efficiency programs continues to meet the expectations laid out in BED's Integrated Resource Plans (IRP) and prior planning documents dating back more than 33 years. Energy efficiency has flattened BED's energy load requirement since the 1990's and BED's consistent investment in energy efficiency will continue to have lasting benefits in the city. Burlington's Net Zero Energy City by 2030 efforts, in concert with Vermont's broad climate action goals, will change historic electric energy usage pattern in the coming years but it will not change BED's continuing commitment to incorporate cost-effective energy efficiency practices in all programs where possible.

Partnerships- This report includes coverage of BED's program activities related to the twenty-third year of operation of the State's — and the nation's — first Energy Efficiency Utility (EEU). With the exception of Burlington, Vermont's electric energy efficiency programs are operated by the non-profit service provider "Efficiency Vermont" (EVT). Thanks to a long history of successful program implementation, BED serves as the City's own EEU and delivers these programs within the City of Burlington, continuing to build on its past success in helping Burlington's consumer-owners achieve energy efficient electric use.

BED recognizes that much of its success comes from effective working relationships not only with EVT, but also with its partners VGS (appointed by the PUC as an EEU for their customers), Champlain Valley Weatherization Service (CVWS) and the Burlington 2030 District. A cooperative relationship with VGS helps both organizations promote EEU services. About 95% of Burlington's buildings use natural gas for space heating and about 90% use it for domestic hot water. VGS's willingness to work with BED to promote electrical energy efficiency programs to its natural gas customers has been a noteworthy strength of its joint energy efficiency program offerings. BED and VGS have also created a process to share weatherization program and incentives costs for, an emerging number of, customers who are hybrid heaters i.e., partially natural gas heated, and partially electric heat pump heated.

BED also continues to perform substantial analysis of energy efficiency and demand response impacts on its system as part of the IRP and EEU Demand Resource Plan (DRP) processes. BED updates all of its energy efficiency and demand response planning assumptions on a 3-year basis. BED will continue to test all program design assumptions and pursue all strategies to make programs as cost-effective, and as easy to participate in, as possible. BED remains responsible for reacting with appropriate program design modifications to the changing market conditions that impact customers' decisions about undertaking energy efficiency upgrades.

2023 Outlook -

As described in Section 2 (starting on page 10), 2022 program activity improved from sluggish 2021 activity, however, 2023 remains a challenge to predict with lingering impacts from the pandemic and other economic disruptions. BED continues to monitor existing commercial customer activity in particular, and the "return to work" positions businesses take. The commercial sector represents about 75% of BED's savings goals with the Business Existing Facilities (BEF) program representing about 54% of the total three-year savings goals.

Through continued discussions with Burlington's Community Economic Development Office (CEDO), and other partners, many existing business customers are still

proceeding cautiously, and with many of their employees still working from home. For many, there remains uncertainty about the future of their business survival, viability of current models, cash-flow concerns, and reluctance to take on more debt. The continuation of persistent staffing shortages, supply chain issues and rising material costs intensifies an already tough economic situation.

Also, as mentioned in BED's Quarter 3 2022 EEU Report, BED is pleased with our low-income customer efforts in 2021 and 2022 as we have already exceeded our 2021-2023 MPR goal (currently about 190% of goal) with more projects to be completed in 2023.

BED will continue to use multiple communication channels to inform customers and contractors about all our EEU and Tier 3 program efforts including:

- Website
- Social media
- Press conferences
- Press releases
- E-Newsletter
- Podcast
- Videos (internal & external)
- Front Porch Forum
- North Avenue News articles
- Print ads
- Photos
- Yard signs
- Radio ads

The next section below highlights some of the outreach, engagement, and staff awareness activities, including an increased focus on our BIPOC and income-eligible customers. More information on these efforts is also included in some of the program descriptions below.

1.1 Outreach and Engagement with a Focus on BIPOC and Low- and Moderate-Income Customers (LMI)

BED continues to recognize that these are both exciting and challenging times in the emerging energy transformation world for many customers and we remain committed to ensuring that all of our customers have access to our EEU and Tier 3 programs and services. To reduce potential barriers to participation, BED is also committed to making sure that our utility billing and payment processes are clear, and easy to navigate for all customers, especially those struggling with household budgets.

As a city department and community member, BED acknowledges the hardships that many of our customers have been experiencing due to COVID-19 and on-going global economic impacts. Working toward our EEU, Tier 3 and Net Zero Energy City (NZE) goals, while also overcoming pandemic and economic related challenges, continues to require support and engagement from the community over an extended period. BED also continues to recognize the focus on social and racial justice issues in our community and nation as an opportunity to ensure that our programs and services are available, accessible, and affordable to all of our customers. As the bullet point examples below indicate, BED has embarked on some of this important work to ensure that our programs are consistently impactful. BED also recognizes that the efforts listed below (along with other efforts) will need to be regularly monitored and improved upon.

- BED-Trusted Community Voices (TCVs) Dialogue - Led by CEDO's Opportunity and Engagement Team, the TCV initiative seeks to enhance community engagement efforts and create open dialogue for Burlington residents, with a focus on immigrant and refugee communities. Known as TCV liaisons, trusted community members serve as a bridge between the City/CEDO and their communities to foster more effective, engaging, and supportive relationships. BED continues working with TCV on the following issues:
  - *How BED can do more to reach out to customers, with language translation or other services, so more of our customers can learn about and participate in our programs?*
  - *What are the most useful means for broader communications with our community – inserts in the monthly BED bill, emails, radio, Front Porch Forum, social media, other?*
  - *What types of energy rebate or assistance programs would be most helpful?*

- *BED's Project & Equity Analyst position started in 2023*- This position focuses on many activities including: advising and coordinating with other BED departments on equitable and accessible processes, program design and implementation; identifying opportunities to help advance energy efficiency and

fossil fuel reduction among BIPOC and other under-represented community members; works collaboratively to improve BED's customer care processes, energy efficiency and strategic electrification program design and delivery, and is designing and developing BED's community ambassador program and other community engagement efforts, including regular listening, communication, and outreach with key community stakeholders. This position works across all areas of BED.

- *BED staff learning & awareness city efforts*– As part of our city's commitment to racial equity, the Racial Equity Inclusion and Belonging Department (REID), with support from Human Resources launched City wide Anti-Racist Training. REID has constructed a multi-level training curriculum with the goal of creating a baseline understanding of the history of institutional and systemic racism amongst all City employees, Boards and Commissions, and City Council. The modules are designed to benefit all City of Burlington employees regardless of level of knowledge regarding systemic racism. The training recognizes that all employees should be making continued efforts to learn more and increase understanding of systemic racism, how it impacts us, our customers, and how we can best combat it. These training courses are a requisite part of every current and future employee's professional development.

The remaining pages on this report provide details on BED's delivery of the following EEU services in 2022:

- **Development & Support Services (DSS)**
- **Business New Construction**
- **Business Existing Facilities**
- **Residential New Construction**
- **Existing Homes**
- **Efficient Retail Products**
- **Thermal Energy and Process Fuels (Residential and Commercial)**

2022 was also the start of BED's approved Act 151 pilot programs that are listed below. Program activity is reported starting on Page 65.

Act 151 activities in 2022 include the following:

- **Additive Incentives for all electric vehicles and plugin electric vehicles ("EVs")**
- **Preferred EV dealer network support**
- **Electric vehicle supply equipment ("EVSE") expansion into neighborhoods**
- **Additive incentives for advanced heat pump technologies with integrated controls**
- **Geothermal well testing**
- **Support of DeltaClime VT, a Vermont based business accelerator organization serving start-up ventures focused on climate economy innovation.**

Table 1: All Business & Residential DSM History*

		Costs						MWh		kW	
	Participants	Admin	Services	Incentive	Evaluation	Participant	Total	Annual	Lifetime	Winter	Summer
1991	391	$356,563	$0	$273,437	$6,015	$1,091,190	$1,727,205	3,703	52,103	1,224	0
1992	330	$334,066	$0	$264,615	$14,711	$1,104,050	$1,717,442	3,595	72,723	1,385	0
1993	1,343	$344,326	$0	$501,991	$107,646	$2,052,045	$3,006,008	9,198	133,079	2,634	0
1994	734	$367,600	$0	$197,054	$46,172	$927,802	$1,538,628	3,304	32,558	991	0
1995	827	$255,770	$0	$149,865	$16,666	$1,584,811	$2,007,112	6,764	31,402	1,650	0
1996	774	$215,329	$0	$118,006	$44,318	$500,363	$878,016	2,285	38,654	0	358
1997	735	$143,184	$0	$122,189	$6,011	$848,380	$1,119,764	2,665	39,091	0	714
1998	692	$204,588	$0	$107,140	$353	$731,707	$1,043,788	3,202	43,971	0	822
1999	675	$214,782	$0	$101,224	$1,529	$331,985	$649,520	1,300	14,174	0	358
2000	1,364	$334,762	$97,067	$148,162	$0	$761,673	$1,341,664	3,130	37,211	443	387
2001	1,410	$425,123	$129,955	$208,178	$59,637	$609,115	$1,432,008	3,094	41,258	398	341
2002	1,824	$469,263	$192,143	$407,057	$2,352	$1,178,695	$2,249,510	4,438	63,159	444	520
2003	1,897	$305,283	$365,691	$236,762	$19,006	$538,589	$1,465,331	3,346	56,332	346	361
2004	1,484	$253,037	$302,017	$271,856	$19,067	$638,819	$1,484,796	3,500	46,856	625	557
2005	1,977	$242,385	$351,009	$260,806	$5,904	$970,437	$1,830,541	4,948	69,570	630	630
2006	2,188	$221,862	$352,886	$381,706	$42,057	$702,575	$1,701,086	6,254	83,951	813	891
2007	2,045	$255,856	$375,480	$441,352	$52,025	$1,353,651	$2,478,364	9,679	128,022	1,206	1,158
2008	6,392	$447,867	$412,037	$578,245	$65,159	$1,187,671	$2,690,979	7,299	72,402	1,178	889
2009	1,181	$317,257	$371,233	$452,901	$67,667	$1,959,977	$3,169,035	5,679	64,416	765	811
2010	1,638	$378,153	$339,569	$1,102,597	$54,283	$781,528	$2,656,130	6,492	75,954	1,223	1,148
2011	1,027	$310,536	$381,043	$1,372,682	$69,742	$1,020,842	$3,154,845	7,191	68,153	1,333	1,000
2012	1,244	$296,104	$425,616	$1,035,051	$63,671	$1,968,113	$3,788,555	6,428	75,050	1,118	957
2013	1,229	$289,056	$472,270	$1,228,561	$77,562	$1,793,534	$3,860,982	7,007	82,273	1,267	910
2014	988	$380,161	$577,196	$1,246,484	$63,671	$3,277,600	$5,545,111	5,399	64,811	959	785
2015	1,021	$329,612	$570,899	$1,291,414	$67,289	$2,025,393	$4,284,606	6,025	80,842	849	628
2016	1,427	$383,409	$511,696	$1,367,951	$69,644	$2,292,047	$4,624,747	6,102	72,043	745	529
2017	1,559	$529,382	$561,806	$1,307,062	$69,646	$2,477,247	$4,945,143	7,022	88,436	899	709
2018	1,555	$566,467	$562,927	$1,373,375	$42,397	$1,527,526	$4,072,691	4,896	63,890	886	607
2019	1,489	$545,939	$544,825	$797,194	$54,414	$684,504	$2,626,876	3,551	41,163	589	446
2020	1,228	$611,080	$464,690	$1,738,158	$106,259	$1,062,838	$3,983,025	3,792	57,343	613	492
2021	1,305	$506,856	$374,545	$1,329,429	$61,980	$256,251	$2,529,061	1,813	27,042	277	292
2022	1,659	$619,995	$352,278	$1,220,793	$42,611	$2,088,944	$4,324,621	4,111	64,817	759	609
Total	**45,632**	**$11,455,652**	**$9,088,877**	**$21,633,296**	**$1,419,464**	**$40,329,902**	**$83,927,192**	**157,212**	**1,982,749**	**26,249**	**17,910**

**All history tables in this report reflect adjustments in MWh savings claims from the DPS savings verification process.*

Table 2: All Business DSM History

		Costs						MWh		kW	
	Participants	Admin	Services	Incentive	Evaluation	Participant	Total	Annual	Lifetime	Winter	Summer
1991	3	$130,784	$0	$1,849	$0	$2,157	$134,790	31	93	30	0
1992	16	$149,138	$0	$119,535	$4,063	$454,104	$726,840	246	24,388	227	0
1993	164	$162,366	$0	$305,473	$35,559	$1,308,524	$1,811,922	5,587	72,218	1,421	0
1994	104	$238,153	$0	$163,733	$21,690	$630,639	$1,054,215	2,242	14,970	626	0
1995	163	$199,835	$0	$142,342	$9,480	$1,368,954	$1,720,611	6,137	21,386	1,615	0
1996	151	$151,409	$0	$50,423	$28,498	$355,217	$585,547	1,233	16,150	0	334
1997	160	$78,321	$0	$96,959	$5,612	$757,774	$938,666	2,300	33,565	0	669
1998	164	$141,258	$0	$65,048	$50	$615,144	$821,500	2,767	37,930	0	734
1999	162	$150,772	$0	$71,501	$0	$270,056	$492,329	1,051	10,895	0	338
2000	145	$176,552	$56,070	$80,108	$0	$613,597	$926,327	2,438	28,712	309	334
2001	127	$255,082	$99,310	$84,729	$43,248	$384,763	$867,132	2,064	26,581	240	240
2002	113	$284,826	$112,447	$238,866	$252	$912,280	$1,548,671	2,888	43,183	224	392
2003	144	$154,937	$243,386	$148,306	$9,503	$254,905	$811,037	2,193	32,975	122	162
2004	142	$115,796	$192,327	$140,234	$3,928	$507,253	$959,538	2,505	35,419	335	394
2005	133	$133,542	$208,860	$202,143	$0	$814,001	$1,358,546	3,751	57,787	342	397
2006	150	$112,917	$240,425	$261,310	$24,533	$575,467	$1,214,652	5,094	73,084	503	652
2007	151	$125,761	$244,030	$280,213	$33,320	$977,132	$1,660,456	6,530	104,174	482	763
2008	115	$113,641	$250,666	$304,252	$43,576	$904,640	$1,616,775	3,264	48,407	386	386
2009	105	$173,789	$224,900	$305,352	$44,608	$1,743,182	$2,491,831	3,781	51,336	336	555
2010	228	$168,765	$249,094	$849,801	$35,630	$458,549	$1,761,839	3,489	52,358	511	673
2011	220	$162,357	$277,034	$972,032	$47,704	$335,095	$1,794,222	2,787	37,950	421	521
2012	323	$153,822	$307,898	$721,047	$49,516	$1,667,503	$2,899,786	4,215	54,786	494	680
2013	355	$166,097	$384,773	$952,314	$64,371	$1,320,521	$2,888,076	4,440	55,668	533	537
2014	365	$193,375	$434,315	$846,835	$47,753	$3,006,372	$4,528,650	3,559	43,676	526	524
2015	382	$159,179	$430,188	$746,424	$50,467	$1,709,721	$3,095,979	3,691	50,912	332	382
2016	512	$166,511	$406,350	$893,142	$51,990	$1,659,634	$3,177,627	4,074	39,361	361	397
2017	508	$232,740	$463,676	$907,098	$50,198	$2,183,380	$3,837,092	4,645	53,336	420	544
2018	436	$263,751	$478,835	$951,062	$31,671	$1,021,748	$2,747,066	2,716	30,459	433	464
2019	468	$292,555	$382,503	$575,846	$40,121	$445,251	$1,736,276	2,192	23,130	270	307
2020	448	$361,598	$317,005	$1,044,544	$74,576	$937,736	$2,735,459	2,642	39,210	383	411
2021	383	$282,828	$260,931	$872,954	$46,485	$124,042	$1,587,239	1,396	20,917	189	216
2022	438	$358,306	$240,626	$967,844	$31,958	$1,526,647	$3,125,381	3,334	53,675	597	479
Total	**7,478**	**$6,010,764**	**$6,505,648**	**$14,363,317**	**$930,360**	**$29,845,988**	**$57,656,077**	**99,282**	**1,288,691**	**12,668**	**12,485**

Table 3: All Residential DSM History

		Costs						MWh		kW	
	Participants	Admin	Services	Incentive	Evaluation	Participant	Total	Annual	Lifetime	Winter	Summer
1991	388	$225,779	$0	$271,588	$6,015	$1,089,033	$1,592,415	3,672	52,010	1,194	0
1992	314	$184,928	$0	$145,080	$10,648	$649,946	$990,602	3,349	48,335	1,158	0
1993	1,179	$181,960	$0	$196,518	$72,087	$743,521	$1,194,086	3,611	60,861	1,213	0
1994	630	$129,447	$0	$33,321	$24,482	$297,163	$484,413	1,062	17,588	365	0
1995	664	$55,935	$0	$7,523	$7,186	$215,857	$286,501	627	10,016	35	0
1996	623	$63,920	$0	$67,583	$15,820	$145,146	$292,469	1,052	22,504	0	24
1997	575	$64,863	$0	$25,230	$399	$90,606	$181,098	365	5,526	0	45
1998	528	$63,330	$0	$42,092	$303	$116,563	$222,288	435	6,041	0	88
1999	513	$64,010	$0	$29,723	$1,529	$61,929	$157,191	249	3,279	0	20
2000	1,219	$158,210	$40,997	$68,054	$0	$148,076	$415,337	692	8,499	134	53
2001	1,283	$170,041	$30,645	$123,449	$16,389	$224,352	$564,876	1,030	14,677	158	101
2002	1,711	$184,437	$79,696	$168,191	$2,100	$266,415	$700,839	1,550	19,976	220	128
2003	1,753	$150,346	$122,305	$88,456	$9,503	$283,684	$654,294	1,153	23,357	224	199
2004	1,342	$137,241	$109,690	$131,622	$15,139	$131,566	$525,258	995	11,437	290	163
2005	1,844	$108,843	$142,149	$58,663	$5,904	$156,436	$471,995	1,197	11,783	288	233
2006	2,038	$108,945	$112,461	$120,396	$17,524	$127,108	$486,434	1,160	10,867	310	239
2007	1,894	$130,095	$131,450	$161,139	$18,705	$376,519	$817,908	3,149	23,848	724	395
2008	6,277	$334,226	$161,371	$273,993	$21,583	$283,031	$1,074,204	4,035	23,995	792	503
2009	1,076	$143,468	$146,333	$147,549	$23,059	$216,795	$677,204	1,898	13,080	429	256
2010	1,410	$209,388	$90,475	$252,796	$18,653	$322,979	$894,291	3,003	23,596	712	475
2011	807	$148,179	$104,009	$400,650	$22,038	$685,747	$1,360,623	4,404	30,203	912	479
2012	921	$142,282	$117,718	$314,004	$14,155	$300,610	$888,769	2,213	20,264	624	277
2013	874	$122,959	$87,496	$276,247	$13,191	$473,013	$972,906	2,567	26,605	734	373
2014	623	$186,786	$142,880	$399,649	$15,918	$271,228	$1,016,461	1,840	21,135	433	261
2015	639	$170,433	$140,711	$544,989	$16,822	$315,672	$1,188,627	2,334	29,930	517	246
2016	915	$216,898	$105,346	$474,809	$17,654	$632,413	$1,447,121	2,028	32,682	384	132
2017	1,051	$296,642	$98,130	$399,964	$19,448	$293,867	$1,108,051	2,377	35,100	479	165
2018	1,119	$302,715	$84,092	$422,314	$10,726	$505,778	$1,325,625	2,180	33,431	453	143
2019	1,021	$253,384	$162,322	$221,349	$14,293	$239,253	$890,601	1,359	18,033	319	139
2020	780	$249,481	$147,685	$693,614	$31,683	$125,102	$1,247,566	1,150	18,133	230	81
2021	922	$224,028	$113,614	$456,475	$15,495	$132,209	$941,822	417	6,125	88	76
2022	1,221	$261,689	$111,652	$252,949	$10,653	$562,296	$1,199,240	777	11,142	162	130
Total	**38,154**	**$5,444,888**	**$2,583,229**	**$7,269,979**	**$489,104**	**$10,483,915**	**$26,271,115**	**57,930**	**694,058**	**13,581**	**5,425**

2 Overview of EEU Services Results

As described in more detail in each program below, 2022 proved to be a successful year for achieving savings goals in most programs. Overall, BED achieved 91% of the total annual MWh goal, 110% of the summer coincident–peak KW goal and 116% of the winter coincident–peak KW goal.

BED projected 4,533 annualized MWh savings and achieved 4,111 annualized MWh which will result in 64,817 MWh of savings over the useful life of the installed measures (2022 measures have a weighted average lifetime of about 16 years). BED projected 556 coincident-peak summer KW savings and achieved 609 KW. BED projected 654 coincident-peak winter KW savings and achieved 760 KW.

BED's electric resource acquisition budget for 2022 was $2,165,429 and $2,168,580 was expended. BED's cost for, first year, saved energy was slightly higher than projections. BED estimated it would spend about $477 per annualized MWh saved, and instead spent $527 per annualized MWh.

BED's general administrative costs as a percentage of total BED program costs came in at 10.2%. Other non-program incentive costs were about 16.8% of the 2022 budget, and 73% of the budget was spent on direct technical assistance (energy audits and engineering services) and cash incentives to customers.

Table 4: EEU Business & Residential - Total Resource Benefits

Avoided Costs of Electricity	$5,773,424
Fossil Fuel Savings	($36,465)
Water Savings	$73,706
TRB Total	$5,810,665

	Annual	**Lifetime**
Meter MWh	4,209	66,363
Generation MWh	4,110	64,817
Meter Demand kW	1,709	25,996
Generation Peak Summer kW	558	8,723
Generation Peak Winter kW	758	12,650
Water Savings	$565	$7,875
Fuel Savings	$43	$1,661
O+M Savings	$17,116	$243,091

Table 5: EEU Business & Residential - Summary

	Prior Year 2021	Current 2022	Program to Date
Program Costs			
Incentive and Technical Assistance			
Incentive			
Incentives to Participants (RA)	$ 1,328,339	$ 1,212,577	$ 3,910,703
Incentives to Trade Allies (RA)	$ -	$ -	$ -
Technical Assistance		$ -	$ -
Services to Participants (RA)	$ 464,323	$ 419,765	$ 1,464,835
Services to Trade Allies (RA)	$ 2,915	$ (24)	$ 9,035
Energy Code and Standards Support (DSS)	$ 856	$ 1,660	$ 2,544
Building Energy Labeling and Benchmarking (DSS)	$ -	$ -	$ -
Better Buildings by Design (DSS)	$ 5,436	$ 2,850	$ 11,162
***Incentive & Tech Asst Sub-Total* (1)**	$ 1,801,869	$ 1,636,827	$ 5,398,280
Non-Incentive Program Costs			
Programs and Implementation (RA)	$ 179,050	$ 285,441	$ 573,433
Strategy and Planning (RA)	$ 73,208	$ 35,362	$ 197,022
Marketing Program (RA)	$ 5,985	$ 4,183	$ 10,168
Customer Support (DSS)	$ -	$ -	$ -
General Marketing & Public Education (DSS)	$ 26,286	$ 15,284	$ 57,315
Energy Literacy (DSS)	$ 15,366	$ 10,258	$ 33,568
Applied R&D (DSS)	$ 951	$ 1,481	$ 5,026
Support Services (RA)	$ 55,251	$ 40,832	$ 188,906
Quality Assurance	$ 31,861	$ 23,591	$ 109,142
***Non-Incentive Program Sub-Total* (2)**	$ 387,958	$ 416,434	$ 1,174,580
Total Program Costs	$ 2,189,827	$ 2,053,261	$ 6,572,860
		$ -	
Administrative		$ -	
Sr. Management, Budget, Financial Oversight (RA)	$ 131,505	$ 66,815	$ 293,914
Policy & Public Affairs (DSS	$ 1,391	$ 5,761	$ 17,455
Planning & Reporting (DSS)	$ 31,813	$ 129,187	$ 232,990
Administration & Regulatory (DSS)	$ -	$ -	$ -
IT (DSS)	$ 25,582	$ 20,177	$ 70,444
Evaluation (DSS)	$ 19,733	$ 18,475	$ 54,517
Direct and Indirect Overhead	$ 40,441	$ 21,251	$ 123,623
***Administrative Sub-Total* (3)**	$ 250,465	$ 261,665	$ 792,944
		$ -	
Earned Compensation		$ -	
Base Compensation		$ -	
Performance Compensation		$ -	
***Earned Compensation Sub-Total* (4)**		$ -	
Total Program and Administrative	$ 2,440,291	$ 2,314,926	$ 7,365,803
Overall Total	**$ 2,440,291**	$ 2,314,926	**$ 7,365,803**

--- Benefits ---			
Annual MWh	1,806	4,111	161,349
Lifetime MWh	26,949	64,817	2,051,864
Winter Peak kW	278	759	26,954
Summer Peak kW	289	609	19,100
MWh / Participant	1	2	4
Weighted Lifetime	15	16	13

Table 6: EEU Business & Residential - End Use Summary

		MWh			kW			
Description	**Participants**	**Gross**	**Net**	**Lifetime**	**Winter**	**Summer**	**MMBTU**	**CCF**
Air Conditioning Efficiency	113	42.40	42.60	344.60	0.92	12.78	0.00	0.00
Compressed Air	1	31.74	33.84	169.20	6.98	6.96	0.00	0.00
Cooking and Laundry	51	49.95	40.05	514.45	5.43	4.06	0.78	556.40
Hot Water Efficiency	52	59.30	38.88	501.00	6.05	3.07	0.02	8.50
Light Bulb/Lamp	149	151.58	160.69	2,239.98	16.85	29.95	0.00	0.00
Lighting Hardwired Fixture	825	1,461.19	1,588.78	22,479.34	234.74	235.59	-123.92	0.00
Motors	54	11.55	12.09	241.85	2.27	0.00	0.00	0.00
Office Equipment/Electronics	1	0.04	0.04	0.19	0.00	0.00	0.00	0.00
Other	10	1,592.05	1,689.57	31,344.60	405.81	237.78	127.70	0.00
Refrigeration	61	138.72	141.36	2,031.44	15.35	14.56	0.00	0.00
Space Heat Efficiency	23	28.98	30.18	689.57	0.47	0.14	0.00	0.00
Space Heat Replacement	427	539.77	226.91	3,611.15	55.72	56.61	0.00	0.00
Thermal Shell	9	8.51	6.77	132.01	0.61	0.00	38.10	0.00
Ventilation	28	93.27	98.64	517.11	8.38	7.76	0.00	0.00
Total		4,209.05	4,110.39	64,816.50	759.59	609.26	42.68	564.90

2.1 Development and Support Services

The following section highlights BED's Development and Support Services (DSS) activities for 2022 (renamed from Non-Resource Acquisition in 2017). DSS activities are those that do not directly achieve immediate energy savings but are essential to the operation and administration of BED's EEU services and to the long-term success of future efficiency savings and innovation. The DSS categories were developed collaboratively with the DPS as part of the EEU Demand Resource Plan Process and approved by the PUC.

BED's DSS activities include education, applied research, and development, planning and reporting, evaluation, policy and public affairs, information technology and general administration.

Education & Training- This category captures BED's work throughout the year on general energy efficiency education that is geared toward building awareness that leads customers to take action to reduce energy use through efficiency or conservation. BED provides education to – builders and contractors, real estate professionals, K-12 students and teachers, college and universities and the general public.

Applied Research and Development- This work includes BED's collaboration with EVT and other stakeholders on applied research and development activities designed to optimize the creation of cost-effective solutions to meeting BED's long-term resource acquisition goals.

Planning and Reporting- To help keep the Vermont PUC, the DPS, and other stakeholders, informed about BED's EEU activities, BED submits quarterly and annual reports, and an annual plan to the PUC and DPS.

Evaluation- Determining the accuracy of BED's savings claims, evaluation is a critical aspect of BED's responsibilities as an EEU to Burlington rate payers. There are several evaluation activities that BED participates in to help BED continually improve savings quantification methods.

Policy and Public Affairs- This DSS activity captures BED's participation in discussions about energy efficiency and EEU related issues that typically occur throughout the year with regulators and other stakeholders.

Information Technology (IT) - BED's on-going IT initiative consists of continuing the support of and improvement to the EEU database system for the collection and processing of project data and program information critical to tracking, reporting, and planning functions. There is a fairly regular need to alter measure savings characterization, existing tools or add new tools and functionality to the system which helps us to better understand and respond to changes in the Burlington marketplace.

General Administration- This DSS category captures BED's annual activities and costs for the overall management of EEU programs not specific to the individual programs and includes general staff meetings, coordination of program implementation across all program functions and managing and monitoring overall performance and spending.

Table 7: Electric Development and Support Services Activity

Electric DSS Activity	2021 Actual Spending	2022 Actual Spending	2021-2023 Budget	% 2021-2023 Budget
Education & Training	$ 47,599	$ 32,448	$ 99,840	80%
Applied R&D	$ 951	$ 1,481	$ 24,600	10%
Planning & Reporting	$ 29,400	$ 29,960	$ 142,933	42%
Evaluation	$ 19,369	$ 18,192	$ 52,000	72%
Policy & Public Affairs	$ 1,053	$ 5,761	$ 22,870	30%
Information Tech	$ 25,400	$ 18,903	$ 33,600	132%
General Administration	$ 101,433	$ 49,774	$ 137,700	110%
Total	**$ 225,205**	**$ 156,519**	**$ 513,543**	**74%**

2.2 Business Services Overview

This section of the report contains information on BED's Business EEU Services: Business New Construction and Business Existing Facilities (Market Opportunities & Retrofit).

Overall, 2022 results in business services were encouraging as program activity increased significantly from 2021. BED projected 3,785 megawatt-hour (MWh) savings while achieving actual annual energy savings of 3,334 MWh, about 88% of the goal. BED's cost to deliver EEU business services in 2022 was $1,503,349 below the budgeted amount of $1,624,072 by 6%.

As mentioned in the Introduction, it is often difficult to forecast savings and expenses in the Business sector in Burlington. This is due to the potential for completion of a few large, unexpected projects by one or two customers, dramatically exceeding projections, and budgets. On the other hand, savings goals may just as unpredictably be missed due to delays or cancellations of planned significant projects.

Table 8: EEU Business - Total Resource Benefits

Avoided Costs of Electricity	$4,723,650
Fossil Fuel Savings	($49,356)
Water Savings	$0
TRB Total	$4,674,294

	Annual	**Lifetime**
Meter MWh	3,162	50,856
Generation MWh	3,334	53,675
Meter Demand kW	858	13,829
Generation Peak Summer kW	479	7,694
Generation Peak Winter kW	597	10,242
Water Savings	$0	$0
Fuel Savings	$4	$699
O+M Savings	$14,008	$198,536

Table 9: EEU Business - Summary

	Prior Year 2021	Current 2022	Program to Date
Program Costs			
Incentive and Technical Assistance			
Incentive			
Incentives to Participants (RA)	$ 886,235	$ 920,686	$ 2,594,612
Incentives to Trade Allies (RA)	$ -	$ -	$ -
Technical Assistance		$ -	$ -
Services to Participants (RA)	$ 315,106	$ 275,987	$ 965,945
Services to Trade Allies (RA)	$ -	$ -	$ -
Energy Code and Standards Support (DSS)	$ -	$ -	$ -
Building Energy Labeling and Benchmarking (DSS)	$ -	$ -	$ -
Better Buildings by Design (DSS)	$ -	$ -	$ -
***Incentive & Tech Asst Sub-Total* (1)**	$ 1,201,341	$ 1,196,673	$ 3,560,557
		$ -	$ -
Non-Incentive Program Costs		$ -	$ -
Programs and Implementation (RA)	$ 90,392	$ 173,104	$ 324,085
Strategy and Planning (RA)	$ 29,110	$ 22,574	$ 98,799
Marketing Program (RA)	$ 2,176	$ 2,799	$ 4,975
Customer Support (DSS)	$ -	$ -	$ -
General Marketing & Public Education (DSS)	$ -	$ -	$ -
Energy Literacy (DSS)	$ -	$ -	$ -
Applied R&D (DSS)	$ -	$ -	$ -
Support Services (RA)	$ 36,570	$ 28,020	$ 122,219
Quality Assurance	$ 19,407	$ 15,049	$ 64,684
***Non-Incentive Program Sub-Total* (2)**	$ 177,655	$ 241,547	$ 614,763
Total Program Costs	$ 1,378,996	$ 1,438,220	$ 4,175,320
		$ -	
Administrative		$ -	
Sr. Management, Budget, Financial Oversight (RA)	$ 14,555	$ 11,287	$ 48,513
Policy & Public Affairs (DSS	$ -	$ -	$ -
Planning & Reporting (DSS)	$ -	$ 25,802	$ 25,802
Administration & Regulatory (DSS)	$ -	$ -	$ -
IT (DSS)	$ -	$ -	$ -
Evaluation (DSS)	$ -	$ -	$ -
Direct and Indirect Overhead	$ 24,565	$ 17,866	$ 78,428
***Administrative Sub-Total* (3)**	$ 39,120	$ 54,955	$ 152,743
		$ -	
Earned Compensation	$ -	$ -	
Base Compensation	$ -	$ -	
Performance Compensation	$ -	$ -	
***Earned Compensation Sub-Total* (4)**	$ -	$ -	
Total Program and Administrative	$ 1,418,115	$ 1,493,175	$ 4,328,064
Overall Total	**$ 1,418,115**	**$ 1,493,175**	**$ 4,328,064**

--- Benefits ---			
Annual MWh	1,405	3,334	103,298
Lifetime MWh	21,048	53,675	1,354,608
Winter Peak kW	193	597	13,367
Summer Peak kW	217	479	13,578
MWh / Participant	4	8	18
Weighted Lifetime	15	16	13

Table 10: EEU Business - End-Use Summary

		MWh			kW			
Description	**Participants**	**Gross**	**Net**	**Lifetime**	**Winter**	**Summer**	**MMBTU**	**CCF**
Air Conditioning Efficiency	3	0.10	0.11	1.17	0.00	0.09	0.00	0.00
Compressed Air	1	31.74	33.84	169.20	6.98	6.96	0.00	0.00
Hot Water Efficiency	9	18.70	0.00	0.00	0.00	0.00	0.00	0.00
Light Bulb/Lamp	73	135.34	143.62	1,994.66	13.66	27.53	0.00	0.00
Lighting Hardwired Fixture	320	1,076.72	1,146.12	16,071.40	132.80	184.72	-123.92	0.00
Motors	16	4.73	4.92	98.46	0.92	0.00	0.00	0.00
Other	10	1,592.05	1,689.57	31,344.60	405.81	237.78	127.70	0.00
Refrigeration	25	123.23	129.47	1,896.09	14.24	13.17	0.00	0.00
Space Heat Efficiency	9	27.76	28.89	676.70	0.19	0.01	0.00	0.00
Space Heat Replacement	38	60.55	60.44	937.63	14.63	1.49	0.00	0.00
Ventilation	1	91.49	96.94	484.69	8.17	7.55	0.00	0.00
Total		3,162.41	3,333.91	53,674.60	597.40	479.30	3.78	0.00

2.2.1 Business New Construction

Program Description

This service helps commercial builders and developers incorporate the most energy efficient products and systems possible when building or renovating. It is designed to help customers exceed Vermont's Commercial Building Energy Code (CBES). By working directly and early in the process with designers and owners, BED assists in the choice of energy efficient systems and construction practices that meet business and energy needs.

The program offers financial incentives for the installation of cost-effective efficiency measures. Eligible participants gain technical assistance, verification services and financial incentives to help with efficient building design and equipment costs. BED's Business New Construction service (BNC) addresses all energy consuming equipment, components, or practices, including thermal envelope, motors, lighting, heating, ventilation, air-conditioning (HVAC) and building energy control packages.

BED maximizes the adoption of energy efficient systems and techniques through proactive outreach and recruitment. As both an electric distribution utility and a municipal department with a role in the City's design review process, BED is in a unique position to identify new construction and major renovation before significant design efforts begin. BED coordinates this effort with other city agencies including the city's Planning & Zoning Department and its Department of Permitting & Inspections.

After several years of offering a fairly prescriptive based program, BED, starting in 2014, began to offer an "energy model/tiered incentive" based option for larger projects. The primary motivation was to gain deeper savings per project across more end uses. Historically, BED had been successful with lighting but not as strong with thermal envelope, integrated design approaches and HVAC controls. With baselines increasing due to energy code revisions, and with electric heat pump heating and cooling technology options increasing (coupled with BED's net–zero city strategic direction), BED embarked on a new approach.

BED's tiered incentive approach pays 50% of the incentive at project completion and then the remaining incentive after about one year of comparing actual energy usage data to the building energy model. In order to best estimate the energy efficiency potential of larger buildings, robust energy modeling software is used to compare the energy performance of an energy code compliant design to a model of the final "more efficient" building design. The original energy model assumptions are fine-tuned, as needed, with actual operating hours, set points and plug loads.

It often takes about a year for larger commercial buildings to be fully occupied, equipped, and debugged of any performance issues. This approach allows for deeper BED involvement, more accurate savings claims and ensures that building operators are encouraged to optimize the energy performance of buildings. BED starts to monitor the energy usage data shortly after occupancy and provides feedback to the project team. This approach continues to be well received by customers and the design and building community.

Project Highlights

The annualized megawatt-hour (MWh) savings for 2022 were 1,339, about 1% higher than the 1,325 MWh goal. Total BED program costs were $374,582, about 34% lower than the budgeted amount of $568,425.

Variance Discussion

Customers make business decisions independent of BED's program budgeting efforts, and we fully anticipate that year to year results will be "lumpy" and show dramatic swings in performance. Also, timing plays a role in annual results as some projects are not completed precisely in the planned year. BED's tiered-incentive approach also impacts year-to-year results as partial incentives can be paid in one year, but the savings are not claimed until the following year. Long-term average results are a better indicator of what can be expected on an annual basis than any given year's data.

Program Outlook

2023 will continue to see further coordination between BED's EEU and Tier 3 programs. Heat pump technology is continuing to emerge as an alternative for building space conditioning, even when natural gas service is available. Accordingly, BED will continue to evaluate the costs and benefits of various HVAC systems such as air source and ground source heat pumps.

Combining BED's Tier 3 and EEU funds together can help to further the City's transition away from fossil fuels to renewable electricity. Tier 3 funds can be used to influence heat pump adoption and EEU funds can be applied toward the highest efficiency water source heat pumps, thermal shell measures, energy recovery ventilation systems, building controls and lighting.

BED will also continue to offer financial assistance for commercial building envelope commissioning. With a growing number of heat pump heated and cooled buildings (ductless mini splits, variable refrigerant flow (VRF) and ground source heat pump systems) coming online, high performance building shells, and HVAC controls, are an increased focus. With the help of Vermont based thermal envelope specialists, BED continues working with Architects, owners, and contractors to encourage building envelopes that are being designed and constructed utilizing higher performance thermal envelope techniques.

Table 11: EEU Business New Construction - Total Resource Benefits

Avoided Costs of Electricity	$2,240,227
Fossil Fuel Savings	$14,268
Water Savings	$0
TRB Total	$2,254,495

	Annual	**Lifetime**
Meter MWh	1,261	25,156
Generation MWh	1,339	26,698
Meter Demand	341	6,801
Generation Peak Summer kW	188	3,745
Generation Peak Winter kW	357	7,131
Water Savings	$0	$0
Fuel	$117	$2,394
O+M Savings	$0	$0

Table 12: EEU Business New Construction - Summary

	Prior Year 2021	Current 2022	Program to Date
Program Costs			
Incentive and Technical Assistance			
Incentive			
Incentives to Participants (RA)	$ 361,520	$ 232,227	$ 898,911
Incentives to Trade Allies (RA)	$ -	$ -	$ -
Technical Assistance			$ -
Services to Participants (RA)	$ 112,661	$ 94,569	$ 327,961
Services to Trade Allies (RA)	$ -	$ -	$ -
Energy Code and Standards Support (DSS)	$ -	$ -	$ -
Building Energy Labeling and Benchmarking (DSS)	$ -	$ -	$ -
Better Buildings by Design (DSS)	$ -	$ -	$ -
***Incentive & Tech Asst Sub-Total* (1)**	$ 474,181	$ 326,796	$ 1,226,872
			$ -
Non-Incentive Program Costs			$ -
Programs and Implementation (RA)	$ 11,297	$ 11,180	$ 33,786
Strategy and Planning (RA)	$ 6,731	$ 6,235	$ 21,447
Marketing Program (RA)	$ 690	$ 750	$ 1,440
Customer Support (DSS)			$ -
General Marketing & Public Education (DSS)			$ -
Energy Literacy (DSS)			$ -
Applied R&D (DSS)			$ -
Support Services (RA)	$ 6,731	$ 6,235	$ 21,447
Quality Assurance	$ 4,487	$ 4,156	$ 14,298
***Non-Incentive Program Sub-Total* (2)**	$ 29,936	$ 28,556	$ 92,418
Total Program Costs	$ 504,117	$ 355,352	$ 1,319,290
Administrative			
Sr. Management, Budget, Financial Oversight (RA)	$ 3,365	$ 3,117	$ 10,723
Policy & Public Affairs (DSS			$ -
Planning & Reporting (DSS)		$ 11,147	$ 11,147
Administration & Regulatory (DSS)			$ -
IT (DSS)			$ -
Evaluation (DSS)			$ -
Direct and Indirect Overhead	$ 5,684	$ 4,966	$ 14,542
***Administrative Sub-Total* (3)**	$ 9,050	$ 19,230	$ 36,412
Earned Compensation			
Base Compensation			
Performance Compensation			
***Earned Compensation Sub-Total* (4)**			
Total Program and Administrative	$ 513,167	$ 374,582	$ 1,355,702
Overall Total	**$ 513,167**	**$ 374,582**	**$ 1,355,702**

--- Benefits ---			
Annual MWh	320	1,339	25,844
Lifetime MWh	5,395	26,698	385,919
Winter Peak kW	61	357	3,091
Summer Peak kW	44	188	3,906
MWh / Participant	40	223	73
Weighted Lifetime	17	20	15

Table 13: EEU Business New Construction - End Use Summary

		MWh			kW			
Description	**Participants**	**Gross**	**Net**	**Lifetime**	**Winter**	**Summer**	**MMBTU**	**CCF**
Lighting Hardwired Fixture	3	14.21	15.11	226.69	1.66	2.59	-10.68	0.00
Other	3	1,247.16	1,323.55	26,471.06	355.28	185.28	127.70	0.00
Total		1,261.37	1,338.67	26,697.75	356.95	187.87	117.02	0.00

2.2.2 Business Existing Facilities
(Market Opportunities & Retrofit Services)

Program Description

Business Existing Facilities, Market Opportunity Service (MOP) targets naturally occurring equipment changeovers to secure energy savings in the equipment replacement market. Targeted equipment includes lighting, heating, ventilation, cooling, water heating, refrigeration, motors and drives, controls, and industrial process applications. This program offers prescriptive and custom tracks, with technical assistance, financial incentives (coupled with an on-bill financing option) that encourage the adoption of cost effective, high efficiency alternatives to standard efficiency equipment.

BED and EVT jointly offer statewide prescriptive incentives (fixed incentives for specific eligible measures) for building lighting, refrigeration, controls, motors, and unitary HVAC equipment.

Non-prescriptive cost-effective measures or combinations of measures are eligible for custom incentives. Custom incentives are designed to capture as many potential lost opportunity resources as possible, while maximizing program delivery resources. BED staff and trade allies serving Burlington (including equipment vendors, manufacturers, suppliers, contractors, architects, and engineers) market the program to potential participants.

As natural gas is the predominant heating fuel in Burlington, BED works closely with VGS to encourage a comprehensive approach to energy savings. BED and VGS staff are committed to bringing appropriate projects to each other's attention.

Business Existing Facilities, Retrofit Service offers energy efficiency services that have been provided by BED staff for over two decades. Building retrofit entails BED staff and/or trade allies examining customer buildings and systems to identify energy

efficiency opportunities for the customer. When promising projects are identified, BED staff prepares analyses for the customer showing the costs and benefits of potential energy efficiency measures. This service is offered to all business customers – from the smallest retail store to the largest commercial facility.

Program Highlights

The annualized megawatt-hour (MWh) savings for 2022 were 1,995, about 19% lower than the goal of 2,460 MWh. Total BED program costs were $1,128,767 which is about 7% higher than the budgeted amount of $1,055,647.

As BED's largest program in most years (the commercial customer sector consumes about 75% of BED's total annual kWh sales), BEF program managers are responsible for delivering services across a diverse population of institutions and businesses, from a large hospital and colleges to office buildings, tiny bookstores, restaurants, and clothing boutiques. BED's largest customers consume between 1,000 and 57,000 MWh per year and typically exceed peak demand of 100 kW. Many smaller customers, on the other hand, have the energy profile of large residential homes, consuming about 8,000 to 20,000 kWh annually. Such diversity requires a multi-prong implementation strategy.

Variance Discussion

As mentioned in other sections of this report, and in prior Annual Reports and Annual Plans, BED began to explore how to move beyond lighting as the dominant measure in this market several years ago. HVAC, and other measures like refrigeration, need to play a more prominent role going forward but with about 70% of BED's commercial customers leasing their spaces, HVAC improvements present strong challenges. Also, HVAC and refrigeration equipment typically have longer lifetimes than lighting measures so there are less frequent replacement opportunities, and they can be much more expensive measures to install relative to lighting upgrades.

Program Outlook

BED, in partnership with VGS, will continue to leverage participation in the Burlington 2030 District effort. 2030 Districts are unique private/public partnerships in designated urban areas across North America committed to reducing energy use, water, and transport emissions. Overseen by Architecture 2030, 2030 Districts are in the vanguard of grassroots collaborative efforts to renovate existing buildings and construct high-performance infill development and redevelopment. More information is available at: http://www.2030districts.org/burlington. Also, the video featuring two property members describes the customer experience further, https://www.youtube.com/watch?v=8MryRIwTBaw

Table 14: EEU Business Existing Facilities - Total Resource Benefits

Avoided Costs of Electricity	$2,483,423
Fossil Fuel Savings	($63,623)
Water Savings	$0
TRB Total	$2,419,800

	Annual	**Lifetime**
Meter MWh	1,901	25,700
Generation MWh	1,995	26,977
Meter Demand kW	517	7,028
Generation Peak Summer kW	291	3,950
Generation Peak Winter kW	240	3,112
Water Savings	$0	$0
Fuel Savings	($113)	($1,695)
O+M Savings	$14,008	$198,536

Table 15: EEU Business Existing Facilities - Summary

	Prior Year 2021	Current 2022	Program to Date
Program Costs			
Incentive and Technical Assistance			
Incentive			
Incentives to Participants (RA)	$ 524,715	$ 688,459	$ 1,695,701
Incentives to Trade Allies (RA)	$ -	$ -	$ -
Technical Assistance			$ -
Services to Participants (RA)	$ 202,445	$ 181,418	$ 637,984
Services to Trade Allies (RA)	$ -	$ -	$ -
Energy Code and Standards Support (DSS)	$ -	$ -	$ -
Building Energy Labeling and Benchmarking (DSS)	$ -	$ -	$ -
Better Buildings by Design (DSS)	$ -	$ -	$ -
***Incentive & Tech Asst Sub-Total* (1)**	$ 727,160	$ 869,878	$ 2,333,685
			$ -
Non-Incentive Program Costs			$ -
Programs and Implementation (RA)	$ 79,095	$ 161,924	$ 290,299
Strategy and Planning (RA)	$ 22,379	$ 16,339	$ 77,352
Marketing Program (RA)	$ 1,486	$ 2,049	$ 3,535
Customer Support (DSS)	$ -		$ -
General Marketing & Public Education (DSS)	$ -		$ -
Energy Literacy (DSS)	$ -		$ -
Applied R&D (DSS)	$ -		$ -
Support Services (RA)	$ 29,839	$ 21,786	$ 100,772
Quality Assurance	$ 14,919	$ 10,893	$ 50,386
***Non-Incentive Program Sub-Total* (2)**	$ 147,719	$ 212,991	$ 522,345
Total Program Costs	$ 874,879	$ 1,082,868	$ 2,856,030
Administrative			
Sr. Management, Budget, Financial Oversight (RA)	$ 11,190	$ 8,170	$ 37,790
Policy & Public Affairs (DSS			$ -
Planning & Reporting (DSS)		$ 14,656	$ 14,656
Administration & Regulatory (DSS)			$ -
IT (DSS)			$ -
Evaluation (DSS)			$ -
Direct and Indirect Overhead	$ 18,881	$ 12,900	$ 63,886
***Administrative Sub-Total* (3)**	$ 30,070	$ 35,725	$ 116,331
Earned Compensation			
Base Compensation			
Performance Compensation			
***Earned Compensation Sub-Total* (4)**			
Total Program and Administrative	$ 904,949	$ 1,118,593	$ 2,972,362
Overall Total	**$ 904,949**	**$1,118,593**	**$ 2,972,362**

--- Benefits ---			
Annual MWh	1,085	1,995	77,454
Lifetime MWh	15,653	26,977	968,689
Winter Peak kW	132	240	10,276
Summer Peak kW	173	291	9,672
MWh / Participant	3	5	14
Weighted Lifetime	14	14	13

Table 16: EEU Business Existing Facilities - End Use Summary

		MWh			kW			
Description	**Participants**	**Gross**	**Net**	**Lifetime**	**Winter**	**Summer**	**MMBTU**	**CCF**
Air Conditioning Efficiency	3	0.10	0.11	1.17	0.00	0.09	0.00	0.00
Compressed Air	1	31.74	33.84	169.20	6.98	6.96	0.00	0.00
Hot Water Efficiency	9	18.70	0.00	0.00	0.00	0.00	0.00	0.00
Light Bulb/Lamp	73	135.34	143.62	1,994.66	13.66	27.53	0.00	0.00
Lighting Hardwired Fixture	317	1,062.51	1,131.00	15,844.71	131.13	182.13	-113.24	0.00
Motors	16	4.73	4.92	98.46	0.92	0.00	0.00	0.00
Other	7	344.89	366.01	4,873.54	50.53	52.50	0.00	0.00
Refrigeration	25	123.23	129.47	1,896.09	14.24	13.17	0.00	0.00
Space Heat Efficiency	9	27.76	28.89	676.70	0.19	0.01	0.00	0.00
Space Heat Replacement	38	60.55	60.44	937.63	14.63	1.49	0.00	0.00
Ventilation	1	91.49	96.94	484.69	8.17	7.55	0.00	0.00
Total		1,901.04	1,995.25	26,976.85	240.46	291.42	-113.24	0.00

2.3 Residential Service Overview

This section of the report contains information on BED's Residential EEU Services: Residential New Construction, Residential Existing Buildings, Efficient Retail Products and Thermal Energy and Process Fuels (TEPF) services for customers heating with oil, propane, or wood.

In 2022, BED projected 748 annualized MWh residential savings while achieving annual energy savings of 777 MWh; about 4% above the projected goal. BED's cost to deliver residential services in 2022 was $665,008, about 23% more than the projected spending of $541,357. Combining Tier 3, EEU and Act 151funds was a major contributing factor to overall program activity in 2022 with strong heat pump program participation.

As BED has described in past EEU Annual Reports and Annual Plans, the residential class presents particular challenges as about 60% of BED's residential customers are renters and about 85% of these customers pay their electric and natural gas heating bills directly. Rental apartments are typically smaller with fewer appliances and lighting opportunities. BED's best information indicates that about 95% of residential buildings use natural gas for space heating and about 90% use natural gas for domestic hot water.

BED also turns over 30 to 35% of residential accounts each year due to the high percentage of students. Also, BED's (pre-pandemic) average annual usage per residential customer continues to remain flat with a monthly average of about 390 kWh. BED's (pre-pandemic) residential consumption is about **24**% less than the average Vermont residential customer, about **34**% less than the average New England residential customer and about **55**% less than the national average.

BED will continue to test all program design assumptions and pursue all strategies to make programs as cost-effective as possible. BED will also continue to focus on energy education efforts and to continue to strengthen our close collaboration with VGS as we jointly serve a majority of Burlington's residential customers.

As described in the Introduction section above, one of BED's key strategic objectives, outlined in BED's 2020-2021 Strategic Direction document, is to ensure all programs are

equitable and accessible, with a priority given to low-to-moderate income, rental, Black, Indigenous, and people of color (BIPOC), immigrant, and refugee populations. BED will continue to proactively seek customer input and incorporate this input into program designs.

Table 17: EEU Residential - Total Resource Benefits

Avoided Costs of Electricity	$1,049,774
Fossil Fuel Savings	$12,891
Water Savings	$73,706
TRB Total	$1,136,371

	Annual	**Lifetime**
Meter MWh	1,047	15,507
Generation MWh	776	11,142
Meter Demand kW	850	12,167
Generation Peak Summer kW	79	1,028
Generation Peak Winter kW	161	2,408
Water Savings	$565	$7,875
Fuel Savings	$39	$962
O+M Savings	$3,108	$44,555

Table 18: EEU Residential - Summary

	Prior Year 2021	Current 2022	Program to Date
Program Costs			
Incentive and Technical Assistance			
Incentive			
Incentives to Participants (RA)	$ 437,334	$ 291,665	$ 1,311,096
Incentives to Trade Allies (RA)	$ -	$ -	$ -
Technical Assistance		$ -	$ -
Services to Participants (RA)	$ 148,845	$ 143,778	$ 498,518
Services to Trade Allies (RA)	$ 2,171	$ (24)	$ 8,291
Energy Code and Standards Support (DSS)	$ -	$ -	$ -
Building Energy Labeling and Benchmarking (DSS)	$ -	$ -	$ -
Better Buildings by Design (DSS)	$ -	$ -	$ -
***Incentive & Tech Asst Sub-Total* (1)**	$ 588,351	$ 435,420	$ 1,817,905
		$ -	$ -
Non-Incentive Program Costs		$ -	$ -
Programs and Implementation (RA)	$ 86,798	$ 112,337	$ 247,489
Strategy and Planning (RA)	$ 42,611	$ 12,788	$ 96,735
Marketing Program (RA)	$ 3,808	$ 1,384	$ 5,193
Customer Support (DSS)	$ -	$ -	$ -
General Marketing & Public Education (DSS)	$ -	$ -	$ -
Energy Literacy (DSS)	$ -	$ -	$ -
Applied R&D (DSS)	$ -	$ -	$ -
Support Services (RA)	$ 17,566	$ 12,812	$ 65,571
Quality Assurance	$ 11,711	$ 8,541	$ 43,714
***Non-Incentive Program Sub-Total* (2)**	$ 162,495	$ 147,863	$ 458,702
Total Program Costs	$ 750,846	$ 583,283	$ 2,276,607
		$ -	
Administrative		$ -	
Sr. Management, Budget, Financial Oversight (RA)	$ 8,783	$ 6,406	$ 32,785
Policy & Public Affairs (DSS	$ -	$ -	$ -
Planning & Reporting (DSS)	$ -	$ 71,933	$ 71,933
Administration & Regulatory (DSS)	$ -	$ -	$ -
IT (DSS)	$ -	$ -	$ -
Evaluation (DSS)	$ -	$ -	$ -
Direct and Indirect Overhead	$ 14,983	$ 3,385	$ 44,303
***Administrative Sub-Total* (3)**	$ 23,767	$ 81,724	$ 149,021
		$ -	
Earned Compensation		$ -	
Base Compensation		$ -	
Performance Compensation		$ -	
***Earned Compensation Sub-Total* (4)**		$ -	
Total Program and Administrative	$ 774,612	$ 665,007	$ 2,425,628
Overall Total	**$ 774,612**	**$ 665,007**	**$ 2,425,628**

--- Benefits ---			
Annual MWh	401	777	58,051
Lifetime MWh	5,901	11,142	697,256
Winter Peak kW	85	162	13,587
Summer Peak kW	72	130	5,522
MWh / Participant	0	1	2
Weighted Lifetime	15	14	12

Table 19: EEU Residential - End Use Summary

		MWh			kW			
Description	**Participants**	**Gross**	**Net**	**Lifetime**	**Winter**	**Summer**	**MMBTU**	**CCF**
Air Conditioning Efficiency	110	42.30	42.49	343.44	0.92	12.68	0.00	0.00
Cooking and Laundry	51	49.95	40.05	514.45	5.43	4.06	0.78	556.40
Hot Water Efficiency	43	40.60	38.88	501.00	6.05	3.07	0.02	8.50
Light Bulb/Lamp	76	16.24	17.07	245.32	3.19	2.43	0.00	0.00
Lighting Hardwired Fixture	505	384.47	442.66	6,407.94	101.94	50.87	0.00	0.00
Motors	38	6.83	7.17	143.39	1.35	0.00	0.00	0.00
Office Equipment/Electronics	1	0.04	0.04	0.19	0.00	0.00	0.00	0.00
Refrigeration	36	15.49	11.89	135.36	1.11	1.39	0.00	0.00
Space Heat Efficiency	14	1.23	1.29	12.87	0.28	0.14	0.00	0.00
Space Heat Replacement	389	479.22	166.47	2,673.52	41.09	55.12	0.00	0.00
Thermal Shell	9	8.51	6.77	132.01	0.61	0.00	38.10	0.00
Ventilation	27	1.78	1.71	32.42	0.21	0.20	0.00	0.00
Total		1,046.64	776.47	11,141.90	162.18	129.97	38.90	564.90

2.3.1 Residential New Construction

Program Description

This service aims to improve the efficiency of all new homes, and buildings undergoing substantial renovation. This includes single-family homes, multi-family homes and low-income multi-family projects. It addresses all major end uses such as thermal envelope, space heating, water heating, central cooling, ventilation, major appliances, and lighting. Residential New Construction (RNC) encourages builders and consumers to build to the Efficiency Vermont Certified Homes standard (EVCH) which is offered statewide from Efficiency Vermont, VGS and BED.

The EVCH standard is promoted to developers, architects, builders, building supply centers, equipment suppliers and consumers through a combination of marketing, technical assistance to builders and a package of incentives for a better performing thermal shells, HVAC equipment, efficient lighting fixtures, major appliances, and ventilation equipment.

BED uses several methods to encourage participation in this sometimes difficult to influence market. These include:

- BED staff attend monthly Technical Review Committee (TRC) meetings where all major new construction projects are introduced to the Burlington Planning and Zoning Department staff as part of the City's local project approval process.
- New and revised electric service and line extension applications help us track smaller renovation projects that may have bypassed the City's permit approval process. All "ability to serve" letters from BED include information about energy efficiency services.
- The Burlington Department of Permitting & Inspections (DPI) refers projects to BED.

Program Highlights

In 2022, the RNC service achieved 2 MWh in annualized electricity savings for the year which was significantly below the projected 142 MWh goal. At $40,425 spending was 60% lower than the projected spending of $97,444.

Variance Discussion

As BED has reported in previous EEU Annual Reports and Annual Plans, RNC is a difficult market to predict year to year as it only takes a few projects in Burlington to impact savings projections and budgets dramatically. In recent (pre-pandemic) program year history, RNC has worked successfully with a number of multi-family buildings that utilize cold climate heat pumps as the primary heating and cooling source. These "electrically" heated buildings provided strong thermal shell savings to the RNC program, however, the pandemic, coupled with poor economic conditions, limited new construction starts in 2020, 2021 and most of 2022. Fortunately, there are four projects currently under construction that will be completed by the end of 2023.

Program Outlook

In 2023, the RNC program will continue to assist the residential market with exceeding RBES/CBES and will also promote low-load and net-zero building practices. To help promote program objectives, BED will actively participate in regional events such as the Better Building by Design conference and work with relevant associations such as the Vermont Green Building Network, and the Vermont Passive House Association.

BED's RNC program is projected to be dominated by multi-family structures and that cold climate heat pumps (CCHP's) (aka ductless mini splits) will continue to be the most popular HVAC solution for market-rate multi-family new construction projects due to the low first installation cost, especially when air conditioning is desired. As part of BED's on-going beneficial electrification efforts, BED will continue to focus on high performance thermal envelopes, and controls, to help mitigate potential future regrets from strategic thermal electrification.

As we have discussed in previous Annual Plans, from a thermal decarbonization, and net zero energy city perspective, the use of CCHP's can be a positive solution. However, most heat pump buildings to date use electric resistance heat to back-up the CCHP's potential winter peak and customer high bill issues need to be carefully considered if both operate frequently. Fortunately, each of the CCHP buildings built to date have worked with BED to design and construct high performance thermal envelopes which has mitigated peaking, high bill, and comfort issues. Also, for most of the buildings, the electric baseboard heat is on a master control so that it cannot come on until the outside temperature is lower than 5 degrees F.

BED continues to review the 15-minute electric usage data for the CCHP buildings constructed over the past several years, and they are performing well from both a kWh and CP-kW perspective. Again, BED credits the strong attention to detail on the thermal envelopes with a particular focus on air leakage reduction work and blower door testing.

Table 20: EEU Residential New Construction - Total Resource Benefits

Avoided Costs of Electricity	$2,432
Fossil Fuel Savings	$5,703
Water Savings	$0
TRB Total	$8,136

	Annual	**Lifetime**
Meter MWh	2	45
Generation MWh	2	43
Meter Demand	1	31
Generation Peak Summer kW	0	0
Generation Peak Winter kW	0	7
Water Savings	$0	$0
Fuel	$38	$953
O+M Savings	$0	$0

Table 21: EEU Residential New Construction - Summary

	Prior Year 2021	Current 2022	Program to Date
Program Costs			
Incentive and Technical Assistance			
Incentive			
Incentives to Participants (RA)	$ 10,172	$ 17,500	$ 136,554
Incentives to Trade Allies (RA)	$ -	$ -	$ -
Technical Assistance			$ -
Services to Participants (RA)	$ 31,296	$ 6,007	$ 51,995
Services to Trade Allies (RA)	$ -	$ -	$ -
Energy Code and Standards Support (DSS)	$ -	$ -	$ -
Building Energy Labeling and Benchmarking (DSS)	$ -	$ -	$ -
Better Buildings by Design (DSS)	$ -	$ -	$ -
***Incentive & Tech Asst Sub-Total* (1)**	$ 41,468	$ 23,507	$ 188,549
			$ -
Non-Incentive Program Costs			$ -
Programs and Implementation (RA)	$ 17,787	$ 13,120	$ 34,841
Strategy and Planning (RA)	$ 2,819	$ 115	$ 6,868
Marketing Program (RA)	$ 997	$ (77)	$ 920
Customer Support (DSS)	$ -		$ -
General Marketing & Public Education (DSS)	$ -		$ -
Energy Literacy (DSS)	$ -		$ -
Applied R&D (DSS)	$ -		$ -
Support Services (RA)	$ 2,819	$ 115	$ 6,868
Quality Assurance	$ 1,879	$ 77	$ 4,579
***Non-Incentive Program Sub-Total* (2)**	$ 26,302	$ 13,350	$ 54,077
Total Program Costs	$ 67,769	$ 36,857	$ 242,626
Administrative			
Sr. Management, Budget, Financial Oversight (RA)	$ 1,410	$ 57	$ 3,434
Policy & Public Affairs (DSS			$ -
Planning & Reporting (DSS)		$ 3,471	$ 3,471
Administration & Regulatory (DSS)			$ -
IT (DSS)			$ -
Evaluation (DSS)			$ -
Direct and Indirect Overhead	$ 2,405	$ 40	$ 5,392
***Administrative Sub-Total* (3)**	$ 3,815	$ 3,568	$ 12,296
Earned Compensation			
Base Compensation			
Performance Compensation			
***Earned Compensation Sub-Total* (4)**			
Total Program and Administrative	$ 71,584	$ 40,425	$ 254,923
Overall Total	**$ 71,584**	**$ 40,425**	**$ 254,923**

--- Benefits ---			
Annual MWh	12	2	2,080
Lifetime MWh	291	43	37,507
Winter Peak kW	2	0	412
Summer Peak kW	0	0	314
MWh / Participant	2	0	4
Weighted Lifetime	24	22	18

Table 22: EEU Residential New Construction - End Use Summary

		MWh			kW			
Description	**Participants**	**Gross**	**Net**	**Lifetime**	**Winter**	**Summer**	**MMBTU**	**CCF**
Hot Water Efficiency	3	0.01	0.00	0.12	0.00	0.00	0.00	0.00
Space Heat Efficiency	1	0.12	0.11	1.13	0.01	0.04	0.00	0.00
Thermal Shell	3	1.76	1.67	41.78	0.27	0.00	38.10	0.00
Total		1.88	1.79	43.03	0.28	0.04	38.10	0.00

2.3.2 Residential Existing Buildings

Program Description

This service aims to improve the efficiency of all residential existing buildings (REB) including low-income single family, market-rate single-family and all multi-family projects (market-rate and low-income). BED also works closely with VGS and the Champlain Valley Weatherization Service (CVWS) on many of its projects.

The REB program targets both market-driven and discretionary, early replacement/retrofit opportunities. Additionally, the program serves as a point of contact for customers seeking advice about heat pump technology and electric vehicles; electric vehicle charging equipment and other transportation related measures.

Low-income buildings are addressed by a partnership with the state's Low-income Weatherization Assistance Program (WAP). This partnership provides electric efficiency measures to Burlington's low-income electricity consumers. Electrical efficiency measures are delivered to income-eligible electric customers at the time they receive thermal shell, space heating and water heating improvements from CVWS.

BED's best information is that a majority of WAP eligible customers live in multi-family rental buildings where over 95% use natural gas for space heating and domestic hot water. The average annual electric usage for WAP eligible customers is on par with average BED multi-family residential, historic, consumption patterns of about 320 kWh per month. When combining the high saturation of natural gas usage with low electric usage, electric energy savings opportunities are limited but BED is committed to working with our CVWS and VGS partners to provided efficiency services to our income eligible customers.

REB also works closely with high usage households for energy efficiency improvements that can reduce energy bills and solve comfort and moisture related issues. Virtual and on-site energy audits, customer energy education, appliance meter loans, technical assistance, project management and cash incentives are all part of this service.

BED and VGS work with the private (market-rate) rental housing market (customers not eligible for low-income energy services) to increase both participation and the depth of savings per participant. Traditionally, renters (60% of BED's residential customers) have not been strong participants and the same holds true for property-owners where the tenants pay the energy bills directly which is the case in about 85% of Burlington's dwellings; creating the "split-incentive" paradigm.

The "Rental Properties Owners" service offers free tank wraps (electric tanks only), pipe insulation, water saving devices, enhanced rebates for the early retirement of eligible refrigerators, incentives for improving mechanical ventilation along with up to six free screw-in LEDs per apartment.

This service provides savings directly to the tenant but also water savings, and potential maintenance savings via controlled ventilation fans to the property owner. This service allows us the opportunity to develop long-lasting relationships with property-owners to help identify further savings from refrigeration replacements, common area lighting and laundry equipment improvements, weatherization, and ventilation.

Program Highlights

In 2022, REB achieved 224 MWh in annualized electricity savings for the year, about 42% of the projected goal of 535 MWh. At $510,214 spending was 29% higher than BED's projected spending of $395,191.

Variance Discussion

As BED stated in the Introduction, year to year program savings, and spending, can fluctuate based on a number of factors. The Act 151 pilot program was a major contributing factor to overall program activity 2022. BED continued to see strong participation with residential cold climate heat pumps. The combination of BED's Tier 3, EEU and Act 151 incentives funds strongly impacted residential heat pump program participation. Tier 3 and Act 151 funds covered the majority of the heat pump rebates.

Program Outlook

BED and VGS will continue program coordination and collaboration designed to encourage more residential customers to participate in available efficiency programs. This collaboration helps customers to take a more complete look at their total energy picture including the thermal shell, HVAC, thermostat controls, lighting, appliances, along with solutions for comfort or moisture related issues.

About 95% of BED's residential customers use natural gas as their primary space heating source, however, there are a number of dwellings that are mostly natural gas heated but electric usage data also reveals high electric heat usage and/or air conditioning usage. Customers scheduling energy audits are asked for their permission for the two EEU's to share usage data for analysis purposes. BED and VGS have established a methodology so that BED now offers an additional customer incentive to complete the recommended weatherization work. VGS now includes this information in the customers' report with the goal of increasing the "energy audit" to "actual project" completion rate. Anecdotally, several customers expressed their appreciation for this BED and VGS joint effort.

BED and VGS have also developed a similar weatherization cost sharing process where cold climate heat pumps are installed but they can only provide a portion of the space heating load. Customers and contractors are made aware that the full weatherization rebate amounts are available to "hybrid" heated buildings, and they will get a proportional rebate check from both EEU's.

BED will also continue to cultivate partnerships and pursue initiatives that allow for additional opportunities to engage with the ***low-and moderate-income*** customers and also those organizations that serve these customers.

Table 23: EEU Residential Existing Homes - Total Resource Benefits

Avoided Costs of Electricity	$471,723
Fossil Fuel Savings	$7,135
Water Savings	$1,299
TRB Total	$480,156

	Annual	**Lifetime**
Meter MWh	539	8,540
Generation MWh	224	3,498
Meter Demand kW	342	5,434
Generation Peak Summer kW	8	113
Generation Peak Winter kW	49	776
Water Savings	$12	$134
Fuel Savings	$0	$0
O+M Savings	$51	$768

Table 24: EEU Residential Existing Homes - Summary

	Prior Year 2021	Current 2022	Program to Date
Program Costs			
Incentive and Technical Assistance			
Incentive			
Incentives to Participants (RA)	$ 335,581	$ 223,712	$ 837,369
Incentives to Trade Allies (RA)	$ -	$ -	$ -
Technical Assistance			$ -
Services to Participants (RA)	$ 109,950	$ 137,274	$ 416,418
Services to Trade Allies (RA)			$ -
Energy Code and Standards Support (DSS)		$ -	$ -
Building Energy Labeling and Benchmarking (DSS)		$ -	$ -
Better Buildings by Design (DSS)		$ -	$ -
***Incentive & Tech Asst Sub-Total* (1)**	$ 445,531	$ 360,986	$ 1,253,787
			$ -
Non-Incentive Program Costs			$ -
Programs and Implementation (RA)	$ 13,767	$ 32,766	$ 60,151
Strategy and Planning (RA)	$ 31,107	$ 12,769	$ 56,701
Marketing Program (RA)	$ 2,189	$ 2,087	$ 4,276
Customer Support (DSS)			$ -
General Marketing & Public Education (DSS)			$ -
Energy Literacy (DSS)			$ -
Applied R&D (DSS)			$ -
Support Services (RA)	$ 8,234	$ 12,769	$ 33,828
Quality Assurance	$ 5,489	$ 8,513	$ 22,552
***Non-Incentive Program Sub-Total* (2)**	$ 60,786	$ 68,904	$ 177,509
Total Program Costs	$ 506,317	$ 429,890	$ 1,431,296
Administrative			
Sr. Management, Budget, Financial Oversight (RA)	$ 4,117	$ 6,385	$ 16,914
Policy & Public Affairs (DSS			$ -
Planning & Reporting (DSS)		$ 68,462	$ 68,462
Administration & Regulatory (DSS)			$ -
IT (DSS)			$ -
Evaluation (DSS)			$ -
Direct and Indirect Overhead	$ 6,955	$ 3,421	$ 19,058
***Administrative Sub-Total* (3)**	$ 11,072	$ 78,268	$ 104,434
Earned Compensation			
Base Compensation			
Performance Compensation			
***Earned Compensation Sub-Total* (4)**			
Total Program and Administrative	$ 517,389	$ 508,158	$ 1,535,731
Overall Total	**$ 517,389**	**$ 508,158**	**$ 1,535,731**

--- Benefits ---			
Annual MWh	151	224	22,574
Lifetime MWh	2,363	3,498	349,113
Winter Peak kW	35	50	6,124
Summer Peak kW	42	59	1,135
MWh / Participant	0	0	2
Weighted Lifetime	16	16	15

Table 25: EEU Residential Existing Homes - End Use Summary

		MWh			kW			
Description	**Participants**	**Gross**	**Net**	**Lifetime**	**Winter**	**Summer**	**MMBTU**	**CCF**
Air Conditioning Efficiency	3	0.17	0.18	2.15	0.00	0.04	0.00	0.00
Cooking and Laundry	2	0.16	0.17	2.35	0.02	0.02	0.00	3.50
Hot Water Efficiency	40	40.59	38.88	500.88	6.05	3.07	0.02	8.50
Light Bulb/Lamp	14	4.70	4.65	69.73	1.40	0.38	0.00	0.00
Motors	38	6.83	7.17	143.39	1.35	0.00	0.00	0.00
Office Equipment/Electronics	1	0.04	0.04	0.19	0.00	0.00	0.00	0.00
Refrigeration	15	0.73	0.70	11.90	0.07	0.08	0.00	0.00
Space Heat Efficiency	10	0.54	0.57	5.66	0.13	0.05	0.00	0.00
Space Heat Replacement	380	478.54	166.23	2,670.02	41.03	55.04	0.00	0.00
Thermal Shell	6	6.75	5.10	90.23	0.34	0.00	0.00	0.00
Ventilation	1	0.07	0.07	1.33	0.01	0.01	0.00	0.00
Total		539.10	223.75	3,497.85	50.40	58.70	0.02	12.00

2.3.3 Retail Efficient Products

Program Description

The Retail Efficient Products Program (EPP) service aims to increase sales of ENERGY STAR® qualified lighting products, and appliances such as clothes washers, refrigerators, freezers, room air conditioners, dehumidifiers, and a number of consumer electronics. This is accomplished primarily through sales at retail stores with on-site and mail-in consumer rebates, but also by arranging retailer buy-downs and manufacturer mark-downs.

The incentives are intended to entice consumers by lowering the cost of efficient products. EPP uses a variety of marketing and promotion efforts including a catalog, and an on-line purchase web site in order to build consumer awareness and participation in the program.

Program Highlights

Savings of 551 annualized MWh significantly surpassed projection of 72 annualized MWh in 2022. Annual expenditures of $114,369 also significantly exceeded the projected budget of $48,722.

Variance Discussion

LED lighting products accounted for about 52% of total program savings, which was higher than originally projected. EEU messaging regarding the end of most lighting rebates, in 2023, increased participation.

Program Outlook

BED will continue to augment EVTs outreach with its own public education and product awareness campaigns using social media channels, websites, customer newsletters ads and articles in the North Avenue News monthly publication. As most lighting rebates come to an end, EPP will continue to focus on a variety of appliances such as refrigerators, freezers, clothes washers & dryers, window air conditioners,

dehumidifiers, room air cleaners, and a variety of heat pump products. Energy Savings kits and appliance recycling will also be featured in 2023.

Table 26: EEU Efficient Products - Total Resource Benefits

Avoided Costs of Electricity	$575,618
Fossil Fuel Savings	$53
Water Savings	$72,407
TRB Total	$648,079

	Annual	**Lifetime**
Meter MWh	506	6,922
Generation MWh	551	7,601
Meter Demand kW	508	6,702
Generation Peak Summer kW	71	915
Generation Peak Winter kW	112	1,625
Water Savings	$553	$7,741
Fuel Savings	$1	$10
O+M Savings	$3,057	$43,787

Table 27: EEU Efficient Products - Summary

	Prior Year 2021	Current 2022	Program to Date
Program Costs			
Incentive and Technical Assistance			
Incentive			
Incentives to Participants (RA)	$ 91,582	$ 50,453	$ 337,173
Incentives to Trade Allies (RA)		$ -	
Technical Assistance			
Services to Participants (RA)	$ 7,599	$ 497	$ 30,104
Services to Trade Allies (RA)	$ 2,171	$ (24)	$ 8,291
Energy Code and Standards Support (DSS)		$ -	$ -
Building Energy Labeling and Benchmarking (DSS)		$ -	$ -
Better Buildings by Design (DSS)		$ -	$ -
***Incentive & Tech Asst Sub-Total* (1)**	$ 101,352	$ 50,927	$ 375,569
Non-Incentive Program Costs			
Programs and Implementation (RA)	$ 55,245	$ 66,450	$ 152,497
Strategy and Planning (RA)	$ 8,685	$ (96)	$ 33,166
Marketing Program (RA)	$ 622	$ (626)	$ (4)
Customer Support (DSS)			$ -
General Marketing & Public Education (DSS)			$ -
Energy Literacy (DSS)			$ -
Applied R&D (DSS)			$ -
Support Services (RA)	$ 6,513	$ (72)	$ 24,874
Quality Assurance	$ 4,342	$ (48)	$ 16,583
***Non-Incentive Program Sub-Total* (2)**	$ 75,407	$ 65,609	$ 227,116
Total Program Costs	$ 176,760	$ 116,536	$ 602,685
Administrative			
Sr. Management, Budget, Financial Oversight (RA)	$ 3,257	$ (36)	$ 12,437
Policy & Public Affairs (DSS			$ -
Planning & Reporting (DSS)			$ -
Administration & Regulatory (DSS)			$ -
IT (DSS)			$ -
Evaluation (DSS)			$ -
Direct and Indirect Overhead	$ 5,623	$ (76)	$ 19,853
***Administrative Sub-Total* (3)**	$ 8,880	$ (112)	$ 32,290
Earned Compensation			
Base Compensation			
Performance Compensation			
***Earned Compensation Sub-Total* (4)**			
Total Program and Administrative	$ 185,640	$ 116,424	$ 634,975
Overall Total	**$ 185,640**	**$ 116,424**	**$ 634,975**

--- Benefits ---			
Annual MWh	238	551	33,397
Lifetime MWh	3,247	7,601	310,636
Winter Peak kW	48	112	7,051
Summer Peak kW	30	71	4,073
MWh / Participant	1	1	2
Weighted Lifetime	14	14	9

Table 28: EEU Efficient Products - End Use Summary

		MWh			kW			
Description	**Participants**	**Gross**	**Net**	**Lifetime**	**Winter**	**Summer**	**MMBTU**	**CCF**
Air Conditioning Efficiency	107	42.13	42.31	341.28	0.92	12.64	0.00	0.00
Cooking and Laundry	49	49.79	39.88	512.10	5.41	4.04	0.78	552.90
Light Bulb/Lamp	62	11.54	12.42	175.59	1.79	2.05	0.00	0.00
Lighting Hardwired Fixture	505	384.47	442.66	6,407.94	101.94	50.87	0.00	0.00
Refrigeration	21	14.76	11.19	123.46	1.04	1.31	0.00	0.00
Space Heat Efficiency	3	0.57	0.61	6.07	0.14	0.05	0.00	0.00
Space Heat Replacement	9	0.68	0.23	3.50	0.06	0.08	0.00	0.00
Ventilation	26	1.72	1.64	31.09	0.20	0.20	0.00	0.00
Total		505.66	550.93	7,601.02	111.51	71.23	0.78	552.90

3 Thermal Energy and Process Fuels Activity (TEPF) (Residential and Commercial)

Program Description

TEPF services are designed to increase the thermal energy and process fuel efficiency of homes and businesses heating with unregulated fuels, i.e.; oil, LP-gas, kerosene, and wood. However, the scope of these services is limited in Burlington as over 95% of residential and commercial customers are served by VGS, who also implements thermal EEU programs with both comprehensive weatherization and equipment replacement services.

As BED describes in detail in its 2021-2023 EEU Demand Resource Plan, BED's TEPF program is comprised of two resource acquisition components and one emerging research and development component. The components include:

1. Traditional Weatherization Services (a/k/a Home Performance with Energy Star or HPwES);
2. Advanced Manufactured Homes (a/k/a Zero Energy Modular or ZEM);
3. McNeil Biomass Generation Station District Energy System Development (DES)

Traditional Weatherization-

This resource acquisition service focuses on providing non-VGS residential homeowners and businesses with energy audits to identify cost-effective weatherization opportunities and to provide incentives to help pay for eligible work. BED's customers can access a number of statewide services and incentives though the following programs:

Home Performance with ENERGY STAR

BED, EVT and VGS collaborate to deliver TEPF savings to residential customers through a network of Building Performance Institute (BPI) certified contractors installing comprehensive home energy thermal improvements.

Commercial Building Performance

Technical assistance and incentives are provided to TEPF customers as a means to assist business property owners with improving the insulation and comfort of their buildings. Energy audits and improvements are performed by a participating Building Performance Institute (BPI) certified contractor.

Zero Energy Modular Homes (ZEM)-

In partnership with Green Mountain Habitat for Humanity, North Avenue Cooperative ("NAC"), Burlington's Community Economic Development Office (CEDO). Champlain Housing Trust ("CHT"), and VEIC, BED has been actively promoting ultra-efficient VERMOD homes since 2017. Thus far, three ZEMs have been installed in the NAC providing home ownership to three low-income households.

The NAC is Burlington's only mobile home park and consists of about 110 homes that are heated by LP gas or kerosene. Over the years, many of these homes have been served by the low-income weatherization program in collaboration with BED but many of the homes are very old and ready to be replaced.

Starting in 2016, BED, and partners, begun to explore the financial viability of introducing high performance modular homes to the residents as an option over new or pre-owned homes. ZEM homes can be net-zero energy, which eliminates fossil fuel usage, and has a significant financial impact for customers when compared to existing high energy costs.

ZEM's objective is to provide financial and technical assistance to income qualified customers seeking to purchase an affordable home for their families, increase housing options and address fuel poverty. The program focuses primarily on the residents of the NAC but residents living outside of this neighborhood can also apply so long as the eligible home complies with the city's zoning ordinances and the household meets the income eligibility criteria.

Program Highlights

BED's TEPF 2022 savings goals are based on "traditional weatherization services" and "ZEM services". BED achieved 10% of the 2022 annual savings goal with only three traditional

weatherization project completions. BED spent $24,486 in 2022, 13% of the $199,100 annual resource acquisition budget.

Variance Discussion

The pandemic brought weatherization project activity to a stop for most of 2021 and 2022. In addition, the limited unregulated fossil fuel market, as well as the housing characteristics (as described below) of the potential unregulated fuels market, has presented challenges in attracting participants. There was also little ZEM activity in 2022 and we suspect that customers proceed cautiously during difficult economic times including rising mortgage interest rates.

Program Outlook

For traditional weatherization services, we hope that activity will increase with economic improvement. Also, Burlington's new rental housing weatherization ordinance will apply to some of BED's TEFP market, and we stand ready to sever these property-owners. BED's Tier 3 Cold Climate Heat Pump program (CCHP) may also present us with opportunities to weatherize homes that are partial heat pump and partial unregulated fuel. The new Weatherization Repayment Assistance Program (WRAP) (on bill repayment) will also be available to customers.

Regarding ZEM services, BED is hopeful that 2023 will see increased activity as the impacts from on-going pandemic lessen and mortgage interest rates improve. Affordable housing options continue to be a major problem in the greater Burlington area so ZEM's could be an attractive option for some customers.

Overall, BED estimates that there are about 350 homes in the TEPF potential market. The single-family market is made up of homes that are located in the more affluent Burlington neighborhoods where the properties have been relatively well maintained and updated over the years. The potential for energy efficiency savings in the condominium market is also limited (about 150 units heated mostly by LP-gas) but it too presents challenges as about 35% of the units are rentals. The rental property owner, who does not typically pay the energy bill, and will not benefit from the energy savings, is typically unmotivated to participate. For rental buildings, in 2022, BED offered a 50% inventive for eligible weatherization improvements up to

a $10,000 maximum. BED's TEPF weatherization program now follows VGS's incentive levels to help avoid confusion among weatherization contractors and customers.

As part of the current 2024-2027 DRP process, in consultation with the DPS, BED has proposed reduced traditional TEPF budgets and savings targets to better align with our understanding of the limited potential market in Burlington.

McNeil Biomass Generation Station District Energy System Development (DES) -

Regarding DES development, as described in detail in BED's 2023 EEU Annual Plan, BED has been actively working with community leaders, businesses, residents, and internationally recognized district energy engineering firms to develop a DES in the city using the McNeil biomass plant.

BED and other stakeholders continue to work on several fronts to advance the DES project. In 2022, the following significant activities occurred:

2022 Milestones

- Phase 3 feasibility study complete.
- Letter agreement entered between BED, the city, VGS, UVMMC, UVM, The Intervale Center, and Ever-Green Energy to guide additional development work.
- Burlington City Council approval for BED to accept a grant of $5.16 million in federal funds secured by Senator Patrick Leahy.
- 501(c)(3) established to manage the DES project development and initial Board of Directors established and begin meeting.
- Significant additional detailed design, development, and engineering.
- Ongoing meetings with Burlington Public Works to finalize construction details and route.
- Construction RFP Issued.

- In January 2023, the DES commenced the formal Act250 process with a formal request for a jurisdictional opinion that Act250 did not apply to the project itself and that all that would be required from the Act250 perspective is amendments to existing Act250 permits.

As in previous years, BED intends to carry forward CYE 2022 TEPF balances to further support and enhance the project's success in 2023.

Next steps in 2023

- Final construction design in conjunction with DPW team.
- Updated pricing.
- Finalize thermal energy and electric boiler contracts.
- Finalize debt financing structure and rates.
- Initial selection of construction bids.
- Determination of potential construction start date.

For 2022, BED's DES development spending was $1,086,125.

A potential DES remains one of the most significant measures BED can support in furtherance of Burlington's efforts to achieve the City's Net Zero Energy goals. Likewise, a successfully implemented DES would achieve progress toward the State of Vermont's climate and energy goals.

Table 29: Thermal Energy and Process Fuels Activity

Period Costs for TEPF Savings	Residential (2022)	Commercial (2022)	Total
Year to Date Costs	$24,286	$0	$24,286
Annual Budget*	$193,745	$5,355	$199,100
% Of Annual Budget	13%	0%	12%
Energy Savings Results			
MMBTU Year to Date	45	0	18
MMBTU Annual Goal*	455	30	485
% Of MMBTU Annual Goal	10%	0%	9%
Progress Towards MMBTU 3-Year Goals			
MMBTU Cumulative to Date	63	0	63
3-Year MMBTU Goal	1,365	90	1,455
% Of 3-Year MMBTU Goal	5%	0%	4%

*Budgets and savings figures include Traditional and Zero Energy Modular program activities.

3.1 TEPF Development & Support Services (DSS)

Development & Support Service (DSS) activities are essential support services that are not directly related to the acquisition of energy savings but are necessary to ensure that the RA program portfolio is well managed and forward thinking. In total, the DSS budget encompasses the following work areas: education & training, applied research, planning and reporting, evaluation, policy and public affairs, information technology and general administration. Within each of these general activity areas are several sub-activities which are explained in further detail below.

Education and Training

This work includes BED's efforts to build overall awareness of energy efficiency, weatherization, building performance issues and availability of efficiency services from BED, VGS and the low-income weatherization program administrators. These activities are not tied to specific program goals. It includes presentations at public forums and workshops, and activities with Burlington's numerous educational institutions. Media responses and the development of monthly energy tips that submitted to various publications and blogs are also included. BED also shares program costs with EVT for the Home Performance with Energy Star Program.

Applied Research and Development

This activity may support research on "smart" thermostatic controls installed in buildings where there are multiple heating systems present. For example, a heat pump, and some type of secondary fossil-based heating system, in hybrid heated buildings.

Planning and Reporting

This work includes BED's responsibility to provide the PUC and DPS with detailed EEU Annual Plans as described in the "Process and Administration of an Order of an Appointment" document. This work covers all required regulatory reports associated with BED's EEU activities. These reporting activities also help to keep the PUC, DPS, Burlington Electric Commission and customers informed about how BED is meeting its established budgets and savings targets. Such reports include:

- EEU Annual Report- submitted May 1 each year.
- EEU Quarterly Reports
- EEU Annual Plans
- Periodic Ad hoc reporting requests

Evaluation

This activity supports BED's TAG and TRM participation along with other general program evaluation activities such as conducting periodic savings verification studies.

Policy and Public Affairs

This activity supports BED's participation in broad energy efficiency public discussions and EEU related regulatory proceedings. The Thermal Energy Task Force and Building Energy Labeling working group are two examples of this type of work.

Information Technology (IT)

BED's IT activities consist of continuing the support of, and improvement to, the DSM database system for the collection and processing of project data and program information that is critical to tracking, reporting and EEU planning functions. There is a fairly regular need to alter existing tools or add new tools and functionality to the system, which helps us to better understand and respond to changes in the Burlington marketplace.

General Administration

This category covers BED's costs for the overall management of TEPF programs including general staff meetings, coordination of program implementation across all program functions, coordination with other EEU's and managing and monitoring of overall performance and spending.

Table 30: Thermal Energy and Process Fuels DSS Activity

TEPF DSS Activity	2021 Actual Spending	2022 Actual Spending	2021-2023 Budget	% 2021-2023 Budget
Education & Training	$ 344	$ 2,334	$ 6,875	39%
Applied R&D	$ -	$ -	$ 850	0%
Planning & Reporting	$ 2,413	$ 1,492	$ 5,050	77%
Evaluation	$ 364	$ 284	$ 1,200	54%
Policy & Public Affairs	$ 338	$ 193	$ 1,150	46%
Information Tech	$ 182	$ 1,274	$ 1,175	124%
General Administration	$ 5,618	$ 2,050	$ 7,150	107%
Total	**$ 9,259**	**$ 7,626**	**$ 23,450**	**72%**

4 Act 151 Pilot Programs

With Act 151 pilot program funds, BED is pursuing several activities that are additive to and complementary of our existing Tier III programs. These activities are directed at programs that are intended to reduce greenhouse gas emissions in the thermal energy and transportation sectors, have a nexus with electricity usage, do not compete with BED's (or any other DU's) Tier III programs, and result in additional greenhouse gas ("GHG") emissions reductions in a cost-effective manner.

The Act 151 activities are designed to support existing Tier III programs by addressing known market gaps and customer barriers to adopting beneficial electrification technologies. In some cases, the activities seek to accelerate measure adoption and emission reductions by further reducing customers' upfront capital costs beyond existing Tier III incentives, which are limited by the alternative compliance payment ("ACP") cap per megawatt-hour-equivalent ("MWH e").

In other cases, the Act 151 activities are intended to further develop upstream market channels and increase the inventory of beneficial electrification technologies from which customers can choose. Other activities are designed to increase customer awareness about the benefits of electrification, as well as boost market actor education and training. Our overall objective for these programs is to further the State's and City's efforts to transform the building thermal and transportation markets. The primary benefit of these activities is expected to be increased uptake in the number of electrification measures included in our Tier III programs.

Act 151 activities include the following:

- Additive Incentives for all electric vehicles and plugin electric vehicles ("EVs");
- Preferred EV dealer network support;
- Electric vehicle supply equipment ("EVSE") expansion into neighborhoods.
- Additive incentives for advanced heat pump technologies with integrated controls;
- Geothermal well testing; and,
- Support of DeltaClime VT, a Vermont based business accelerator organization serving start-up ventures focused on climate economy innovation.

2021-2022 Act 151 Activity

	Advanced Heat Pumps	Ground Source Heat Pump Test Wells	Efficient Electric Vehicles (EV)	Multi-Family EV Charging Station Support	Preferred Dealer Network Support	Delta Clime VT (energy related business accelerator)	Total Act 151 Programs
Costs for Period	$ 214,901	$ 4,057	$ 62,007	$ 33,628	$ 350	$ 36,738	$ 351,681
2021-2023 Budget	$ 240,000	$ 120,000	$ 90,000	$ 120,000	$ 45,000	$ 90,000	$ 705,000
% of Approved Budget	90%	3%	69%	28%	1%	41%	50%

In 2023, BED plans to continue providing enhanced incentives for several Tier III measures funded through our Energy Efficiency Utility's ("EEU") Act 151 funds. With the PUC's October 10, 2022, Order (Case No. 22-1473), BED's 2023 Act 151 activities includes a transfer of funds, between some of the activities, from the original budgets as described in BED's approved 2021-2023 DRP. Due to a number of economic challenges currently facing area electric vehicle dealers, BED requested a transfer of funds to those activities where we hope to have a greater impact.

It is also important to note that due to the late timing of the Act 151 legislation, as it related to the normal timing of the 2021-2023 DRP process, BED was unable to fully commence its Act 151 program operations until January 2022. Thus, spending and goal achievement is condensed into a two-year period, rather than within the three-year performance period. Nevertheless, BED is working hard toward achieving all of its original Act 151 goals. And, while our Act 151 plans remain to be a *work-in-progress*, BED is currently estimating that for 2023 (only) Act 151 program will result in the following metrics:

Act 151 programs	Tier III participation w/o Act 151 funds	Add'l program participation w/ Act 151 funds	Total Tier III Participation
All Electric & PHEVs	190	42	232
Preferred Dealer Network	-	4	4
MF EVSE Support	3	22	25
Advanced Heat Pumps	322	77	399
Geo-Testing Wells	-	3	3
DeltaClime Projects	-	4	4

5 Appendix

5.1 2021-2023 Quantifiable Performance Indicators (QPI) / Minimum Performance Requirements (MPR) Progress

Table 30: BED's 2021-2023 Electric & TEPF QPI and MPR Results Thru Q4 2022

QPI#	Title	Performance Indicator	2021-2023 Target	Policy Goal Advanced	Progress towards 3 yr Goal (thru Q4 2022)
1	Total Resource Benefits	Present worth of lifetime electric, fossil, and water benefits	$14,354,750	Encourage BED to design and implement efficiency initiatives that will maximize the lifetime electric, fossil fuel, and water benefits	67%
2	Electricity Savings	Annual incremental net MWh expected savings	13,937	Annual incremental MWh savings indicator intended to encourage BED to design and implement efficiency initiatives that will maximize annual incremental electrical energy savings	42%
3	Summer Peak Demand Savings (MW)	Cumulative net summer peak demand expected savings	1.8	Cumulative summer peak demand savings indicator intended to encourage BED to design and implement efficiency initiatives that will maximize the capacity reduction coincident with peak summer demand	47%
4	Winter Peak Demand Savings (MW)	Cumulative net winter peak demand expected savings	2.1	Cumulative winter peak demand savings indicator intended to encourage BED to design and implement efficiency initiatives that will maximize the capacity reduction coincident with peak winter demand	49%
5	Weighted Lifetime MWh Savings	Cumulative Lifetime MWh Savings	160,272	Encourage BED to design and implement efficiency initiatives that will maximize the lifetime electric benefits	57%
6	Administrative Effciency	Total Administrative cost as a % of total budget	$42,627	5% savings based on total Admin costs in next DRP - TBD	TBD at end of 2023

TEPF QPI/ MPR	Title	Performance Indicator	2021-2023 Target	Policy Goal Advanced	Progress towards 3 yr Goal (thru Q4
1	Thermal & Mechanical Energy Efficiency Savings (Residential and Commercial)	Incremental net MMBTU savings (3Yr total)	1,455	Intended to encourage BED to design and implement efficiency initiatives that will maximize unregulated thermal energy savings	10%
2	Residential single family comprehensiveness	1) Average air leakage reduction per project 2) Percent of projects with both shell and heating systems measures installed.	1) 30% reduction per project 2.) 16% of premises	Intended to ensure that energy efficiency initiatives are designed and implemented to acquire comprehensive savings	Currently meeting the air leakage reduction target but not the comprehensiveness target.
3	Equity for residential customers	A minimum level of overall efficiency efforts, as reflected in "traditional" TEPF program spending, will be dedicated to residential customers or 95% of total budget	$ 327,750.00	Intended to encourage BED to design and implement efficiency initiatives that will maximize unregulated thermal energy savings	11%

MPR #	Title	Performance Indicator	2021-2023 Target	Policy Goal Advanced	Progress towards 3 Year Goal (thru Q4 2022)
1	Minimum Electric Benefits (Equity for all Electric Ratepayers)	Total electric benefits divided by total costs	Equal or greater than 1.2 benefit/cost ratio	Equity for all Vermont electric customers as a group by assuring that the overall electric benefits are greater than the costs incurred to implement and evaluate the *EEU* and the *EEC*	1.7 (with BED program and evaluation costs of $5,233392 and ACE of $,9183,227) at end of Q4 2022
2	Equity for Residential Ratepayers	A minimum level of overall efficiency efforts, as reflected in spending, will be dedicated to residential customers	A minimum of 85% of residential-sector share of total RA spending be in the residential sector ($1,412,404 over the 3 year period).	Equity for residential customers by assuring that a minimum level of overall efficiency efforts, as reflected in spending, will be dedicated to residential customers	100% (with spending thru Q4 2022 of $1,420.044
3	Equity for Low-income Customers	A minimum level of overall efficiency efforts, as reflected in spending, will be dedicated to Low-income customers	A minimum of 85% of the low-income sector share of total RA spending be on low-income services (adjusted up to $180,240 from $141,240 over the 3 year period to make up for 2018-2020 shortfall)	Equity for low-income customers by assuring that a minimum level of overall efficiency efforts, as reflected in spending, will be dedicated to low-income households	190% (with spending thru Q4 2022 of $342,485)
4	Equity for Small Business Customers	Number of total non-residential premises with annual electric use 40,000 kWh/yr. or less participating in energy efficiency programs.	180	Equity for small business customers by assuring that a minimum level of overall efficiency efforts, as reflected in participation, will be dedicated to small business accounts	70% of goal (thru Q4 2022)

5.2 *MPR #11 Electric Administrative Efficiency Results for CY2022*

	Incentive, Non-Incentive, and Administrative Cost Report	Business Energy Services		Residential Energy Services				Development & Support Services	Total
		Business New Construction	Business Existing Facilities	Residential New Construction	Efficient Products	Existing Homes	Act 151		
Direct Costs	**Program Costs**								
	Incentive and Technical Assistance								
	Incentive								
	Incentives to Participants (RA)	$232,227	$688,459	$17,500	$50,453	$223,712	$294,185	$0	$1,506,536
	Incentives to Trade Allies (RA)	$0	$0	$0	$0	$0	$0	$0	$0
	Technical Assistance								
	Services to Participants (RA)	$94,569	$181,418	$6,007	$497	$137,274	$10,119	$0	$429,884
	Services to Trade Allies (RA)	$0	$0	$0	-$24		$4,099	$0	$4,075
	Energy Code and Standards Support (DSS)	$0	$0	$0	$0	$0	$0	$1,660	$1,660
	Building Energy Labeling and Benchmarking (DSS)	$0	$0	$0	$0	$0	$0		$0
	Better Buildings by Design (DSS)	$0	$0	$0	$0	$0	$0	$2,850	$2,850
	***Incentive & Tech Asst Sub-Total* (1)**	***$326,796***	***$869,877***	***$23,507***	***$50,926***	***$360,986***	***$308,403***	***$4,509***	$1,945,005
	Non-Incentive Program Costs								
	Programs and Implementation (RA)	$11,180	$161,924	$13,120	$66,450	$32,766	$10,247		$295,688
	Strategy and Planning (RA)	$6,235	$16,339	$115	-$96	$12,769	$8,198		$43,560
	Marketing Program (RA)	$750	$2,049	-$77	-$626	$2,087	$3,545		$7,729
	Customer Support (DSS)								$0
	General Marketing & Public Education (DSS)							$15,284	$15,284
	Energy Literacy (DSS)							$10,258	$10,258
	Applied R&D (DSS)							$1,481	$1,481
	Support Services (RA)	$6,235	$21,786	$115	-$72	$12,769	$6,148		$46,981
	Quality Assurance	$4,156	$10,893	$77	-$48	$8,513	$4,099		$27,690
	***Non-Incentive Program Sub-Total* (2)**	***$28,556***	***$212,991***	***$13,350***	***$65,609***	***$68,904***	***$32,237***	***$27,024***	***$448,671***
	Total Program Costs	*$355,352*	*$1,082,868*	*$36,857*	*$116,536*	*$429,890*	*$340,640*	*$31,533*	*$2,393,676*
Indirect Costs	**Administrative**								
	Sr. Management, Budget, Financial Oversight (RA)	$3,117	$8,170	$57	-$36	$6,385	$6,148	$49,122	$72,963
	Policy & Public Affairs (DSS							$5,761	$5,761
	Planning & Reporting (DSS)	$11,147	$14,656	$3,471	$0	$68,462	$0	$31,452	$129,187
	Administration & Regulatory (DSS)								$0
	IT (DSS)							$20,177	$20,177
	Evaluation (DSS)							$18,475	$18,475
	Direct and Indirect Overhead	**$4,966**	**$12,900**	**$40**	**-$76**	**$3,421**	**$4,894**		$26,145
	***Administrative Sub-Total* (3)**	**$19,230**	**$35,725**	**$3,568**	**-$112**	**$78,268**	**$11,042**	**$124,986**	**$272,708**
	Earned Compensation								
	Base Compensation								
	Performance Compensation								
	***Earned Compensation Sub-Total* (4)**								
	Total Program and Administrative	$374,582	$1,118,593	$40,425	$116,424	$508,158	$351,683	$156,519	$2,666,383
	Overall Total	**$374,582**	**$1,118,593**	**$40,425**	**$116,424**	**$508,158**	**$351,683**	**$156,519**	**$2,666,383**

Summary Metrics			Without Admin Metric			With proposed Admin Metric
Incentive Costs						
Incentive & Technical Assistance			$1,945,005			$1,945,005
Non-Incentive Costs			$448,671			$448,671
Admin			$272,708			$272,708
Earned Compensation			$0			$0
Overall Total			$2,666,383			$2,666,383
Incentive & Technical Assistance % of Total			73%			73%
Incentive to Non-incentive Cost Ratio			4.34			4.34
		Cost	% of Total		Cost	% of Total
Program		$2,393,676	89.8%		$2,393,676	90.6%
Administration		$272,708	10.2%		$248,582	9.4%
Admin Savings ($)					$24,126	
Overall Total		$2,666,383	100.0%		$2,642,258	100.0%

5.3 TEPF Administrative Efficiency Results for CY2022

BED 2022 TEPF

Incentive, Non-Incentive, and Administrative Cost Report

	TEPF Programs	Business Energy Services		Residential Energy	Total
		Business Initiatives	Unregulated Fuels Commercial	Unregulated Fuels Resedential	
Direct Costs	**Program Costs**				
	Incentive and Technical Assistance				
	Incentive				
	Incentives to Participants (RA)			$8,216	$8,216
	Incentives to Trade Allies (RA)				$0
	Technical Assistance				
	Services to Participants (RA)	$1,060,866		$8,107	$1,068,972
	Services to Trade Allies (RA)				$0
	Energy Code and Standards Support (DSS)				$0
	Building Energy Labeling and Benchmarking (DSS)				$0
	Better Buildings by Design (DSS)				$0
	***Incentive & Tech Asst Sub-Total* (1)**	***$1,060,866***	***$0***	***$16,323***	$1,077,189
	Non-Incentive Program Costs				
	Programs and Implementation (RA)	$13,661		$3,643	$17,304
	Strategy and Planning (RA)	$8,816		$1	$8,818
	Marketing Program (RA)				$0
	Customer Support (DSS)				$0
	General Marketing & Public Education (DSS)				$0
	Energy Literacy (DSS)				$0
	Applied R&D (DSS)				$0
	Support Services (RA)			$1	$1
	Quality Assurance			$1	$1
	***Non-Incentive Program Sub-Total* (2)**	***$22,477***	***$0***	***$3,647***	***$26,124***
	Total Program Costs	*$1,083,343*	*$0*	*$19,969*	*$1,103,312*

Indirect Costs	**Administrative**				
	Sr. Management, Budget, Financial Oversight (RA)	$1,556		$1	$1,557
	Policy & Public Affairs (DSS				$0
	Planning & Reporting (DSS)			$4,516	$4,516
	Administration & Regulatory (DSS)				$0
	IT (DSS)				$0
	Evaluation (DSS)				$0
	Direct and Indirect Overhead	**$1,227**			$1,227
	***Administrative Sub-Total* (3)**	**$2,783**	**$0**	**$4,517**	**$7,300**
	Earned Compensation				
	Base Compensation				
	Performance Compensation				
	***Earned Compensation Sub-Total* (4)**				
	Total Program and Administrative	$1,086,126	$0	$24,486	$1,110,612
	Overall Total	**$1,086,126**	**$0**	**$24,486**	**$1,110,612**

Summary Metrics	Without Admin Metric		With proposed Admin Metric	
Incentive Costs				
Incentive & Technical Assistance	$1,077,189		$1,077,189	
Non-Incentive Costs	$26,124		$26,124	
Admin	$7,300		$7,300	
Earned Compensation	$0		$0	
Overall Total	$1,110,612		$1,110,612	
Incentive & Technical Assistance % of Total	97%		97%	
Incentive to Non-incentive Cost Ratio	41.23		41.23	
	Cost	% of Total	Cost	% of Total
Program	$1,103,312	99.3%	$1,103,312	99.4%
Administration	$7,300	0.7%	$6,935	0.6%
Admin Savings ($)			$365	
Overall Total	$1,110,612	100.0%	$1,110,247	100.0%