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June 7, 2022 Docket No. 19-057-33

Utah Public Service Commission
Heber M. Wells Building
P. O. Box 45585
Salt Lake City, UT 84145-0585

Re: *Dominion Energy Utah's Annual Report on 2021 Sustainable Transportation & Energy Plan*

Commissioners:

In compliance with the Utah Public Service Commission's (Commission) Order in Docket No.19-057-33, Dominion Energy Utah (DEU or the Company) files this annual report related to the Sustainable Transportation and Energy Plan (STEP) for the program year beginning March 1, 2021 and ending February 28, 2022. This report summarizes University of Utah's Intermountain Industrial Assessment Center (IIAC) STEP expenditures, potential energy efficiency and clean air benefits, estimated efficiency project paybacks, and participating businesses who took advantage of these enhanced assessments during the first program year. The Company consulted with the Division of Public Utilities (DPU) and Office of Consumer Services to create quarterly STEP reports. This annual report is based on the quarterly report format.

As background, the Company, DPU, and OCS submitted a Settlement Stipulation (Stipulation) in Docket No. 19-057-33 to the Commission on July 16, 2020. The Commission approved the Stipulation on August 31, 2020, and ordered a program start date of October 1, 2020. The terms of the Stipulation included funding for the IIAC at a level of $500,000 annually for a pilot-period of two years. In return for the funding, the IIAC is required to perform 20 energy efficiency assessments (in addition to the 20 Department of Energy funded energy efficiency assessments) and 40 clean air assessments in each of the pilot-period program years.

The Stipulation also includes a temporary suspension feature, which could be invoked by the Company and IIAC due to COVID-19 pandemic-related restrictions. As a result of the ongoing COVID-19 pandemic, the Company and the IIAC initially experienced difficulties and setbacks related to performing the assessments contemplated in the Stipulation. Consequently, the Company sought, and the Commission approved, an adjusted IIAC program year of March 1, 2021 – February 28, 2022.

Since March 1, 2021, DEU and the IIAC have resolved all COVID-19 related issues. Additionally, the IIAC has performed 20 STEP-related energy efficiency assessments and 40 clean air assessments at qualifying business facilities located throughout Utah. The included report

provides details on the completed assessments including specifics on the 234 potential energy efficiency projects that the IIAC identified which, if undertaken by the assessed businesses, would result in estimated natural gas usage reductions of more than 918,000 dekatherms annually and reduced electricity consumption of nearly 40 million kilowatt hours per year. It is estimated that these energy efficiency projects would cost $79 million to complete but would save the assessed businesses nearly $41 million annually, resulting in a simple payback period of 1.9 years. In addition to the financial benefits, the IIAC estimated that full implementation of the 234 potential energy efficiency projects would result in an annual reduction in CO_2 emissions of 56,000 tons and criteria pollutant[1] emissions reductions of 64.8 tons.

Respectfully Submitted,

Michael A. Orton

Michael A. Orton

cc: Division of Public Utilities
Office of Consumer Services

[1] The U.S. Environmental Protection Agency has established national ambient air quality standards (NAAQS) for six of the most common air pollutants— carbon monoxide, lead, ground-level ozone, particulate matter, nitrogen dioxide, and sulfur dioxide—known as “criteria” air pollutants (or simply “criteria pollutants”).

ANNUAL REPORT FY2021

Intermountain Industrial Assessment Center Pilot Program

Intermountain Industrial Assessment Center
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FUNDING FROM THE SUSTAINABLE TRANSPORTATION AND ENERGY PLAN

Introduction

In 2019, the Sustainable Transportation and Energy Plan Act ("STEP Act") was amended by the State of Utah to authorize a large-scale natural gas utility (i.e. Dominion Energy Utah - DEU) "to establish natural gas clean air programs that promote sustainability through increasing the use of natural gas or renewable natural gas that the commission determines are in the public interest…" [Utah Code 54-4-13.1 (3)]. On August 31, 2020, the Utah Public Service Commission (PSC) approved DEU to establish the Intermountain Industrial Assessment Center (IIAC) pilot program using a balancing account to fund the program through a STEP surcharge tariff of DEU customers. DEU has partnered with the University of Utah's IIAC to conduct energy efficiency assessments and identify opportunities, technologies, and practices to improve Utah's air quality and assist DEU customers in adopting future-facing energy strategies. Any DEU customer who utilizes at least 2,500 dekatherms each year and is willing to be a part of the program is eligible to participate, regardless of rate schedule. For marketing purposes, the pilot program has been entitled StepWise to allow the IIAC and DEU to differentiate between their existing Department of Energy (DOE) manufacturing assessment and ThermWise energy efficiency programs, respectively. This report is a summary of the assessments and analysis results, impact of COVID-19 on the program, and detailed budget expenditures from March 1, 2021 through February 28, 2022.

Accomplishments

In the first year of the program, the IIAC team has successfully completed 20 energy and clean air assessments at facilities all around Utah – from Moab to Promontory. The team looked at renewable natural gas (RNG) opportunities with wastewater treatment plants, steam plant improvements at manufacturers, and hydrogen and innovative natural gas opportunities with higher education and municipal customers. For each assessment, the team evaluated air quality improvements associated with individual recommendations to effectively quantify benefits to Utah's ratepayers and Utahns as a whole.

The IIAC team, listed below, is excited to share their efforts with the Public Service Commission and other regulatory parties of the State of Utah.

Kody Powell, Ph.D., IIAC Director, StepWise Principal Investigator (PI)	Kerry Kelly, Ph.D., StepWise Co-PI
Julie Sieving, P.E., C.E.M., StepWise Director	Moriah Henning, StepWise Manager

ENERGY AND CLEAN AIR ASSESSMENTS

Assessment Process

IIAC can be considered to house two branches, following the PSC approval of the IIAC Pilot Program. The DOE branch is a previously established part of a national program that uses federal funding to perform energy assessments for small to medium manufacturers. DOE customers are required to meet several criteria to be eligible for an assessment: greater than $100,000 and less than $2,500,000 in energy expenditures, annual sales under $100 million, fewer than 500 employees, and no in-house energy professionals. The assessments analyze all inputs and outputs of utilities equally with the focus spread across a customer's natural gas, electricity, water, and/or waste management practices.

With the approval of the IIAC Pilot Program, IIAC has expanded its customer base to include commercial, state, and municipal customers with the initiation of the StepWise branch. The program also extends services to DEU customers on a transportation service (TS) or fixed service (FS) rate schedule who were not previously eligible for DEU's energy efficiency efforts with the ThermWise program. StepWise customers are required to meet the following criteria for eligibility: be a DEU customer, use at least 2,500 dth/year of natural gas, and be willing to be acknowledged as a participant.

Due to the different eligibility requirements between the two branches, results targeting natural gas efficiency, renewable natural gas, and hydrogen opportunities have been more easily identified in the StepWise assessments. The clean air analyses performed for both branches of assessments demonstrate the potential for a positive impact on Utah's air quality.

Over the fiscal year of March 2021 through February 2022, StepWise completed assessments, including clean air analyses, and provided related reporting to 20 customers. Additionally, StepWise completed 20 clean air assessments to supplement the energy assessments already completed for 20 DOE customers. StepWise customers included a wide variety of industrial, commercial, municipal, universities, and government participants. The customers who participated in a StepWise assessment during FY 2021 are listed as follows:

- Marathon Petroleum – Salt Lake City
- Central Davis Sewage Treatment
- University of Utah Real Estate – Research Park
- Northrop Grumman – Clearfield Propulsion Systems
- Marathon Petroleum – Cogeneration System
- Northrop Grumman – Bacchus West
- Utah Valley Hospital
- Hill Air Force Base – Building 260
- Salt Lake City Department of Airports – Airport Operations Center
- University of Utah Health Sciences – Buildings 500 and 512
- Weber State University – Browning Center
- Spanish Fork Wastewater Treatment Plant
- Utah State University – Eastern Campus
- Grand County School District
- Salt Lake City Department of Airports – North Support Area
- Jordan County School District – Terra Linda Elementary School
- Weber State University – Swenson Gym Complex
- Church of Jesus Christ – Welfare Square Dairy
- West Point Dairy
- Hill Air Force Base – Building 269

Assessment Results

Results from the 40 total energy and clean air assessments are detailed in Tables 1 and 2 below. In the tables, StepWise reports have a "SW" report number, while DOE reports have a "UU" number.

Table 1 details the total potential annual emissions reductions for equivalent carbon dioxide (Eq CO2), nitrogen oxides (NOx), sulfur dioxide (SO2), particulate matter 2.5 (PM2.5), volatile organic compounds (VOCs), and ammonia (NH3) in pounds per year for each assessment. The percentage of emissions which comes from natural gas savings is noted as %NG in the column to the right of each pollutant. Note that negative numbers in Table 4 indicate an increase in emissions, and % NG over 100% indicates an increase in electricity emissions but a decrease in natural gas emissions.

Example 1:

$$103\ \%\ \mathrm{NG} = \frac{21{,}000{,}000\ \text{eq CO2 natural gas lb/yr}}{-700{,}000\ \text{eq CO2 electricity}\frac{\text{lb}}{\text{yr}} + 21{,}000{,}000\ \text{eq CO2 natural gas}\frac{\text{lb}}{\text{yr}}}$$

Alternatively, a negative % NG value indicates an increase in natural gas emissions and a negative value over 100% indicate the natural gas emissions increase was less than the net savings

Example 2:

$$-200\ \%\ \mathrm{NG} = \frac{-1{,}000\ \text{NOx natural gas lb/yr}}{3{,}000\ \text{NOx electricity}\frac{\text{lb}}{\text{yr}} - 1{,}000\ \text{NOx natural gas}\frac{\text{lb}}{\text{yr}}}$$

See the Appendix for a detailed explanation of air quality analysis. This appendix is included in all reports delivered to customers.

Table 2 details the total number of recommendations identified, potential energy and cost savings, implementation costs, and total simple payback period of each assessment.

Table 3 details the natural gas usage of each facility who participated in a StepWise assessment to demonstrate qualification under the 2,500 dth/year natural gas requirement. For confidentiality purposes, natural gas usage totals at DOE assessment facilities are not shared. Assessment dates are noted to demonstrate completion of all assessments within or before FY2021.

Table 1 - Annual potential emissions improvements

Report Number	Equivalent CO2 (lb/yr)	% NG	NOx (lb/yr)	% NG	SO2 (lb/yr)	% NG	PM2.5 (lb/yr)	% NG	VOCs (lb/yr)	% NG	NH3 - Electricity Only (lb/yr)
SW2021-01	550,300	81%	462	80%	63	3%	33	84%	25	81%	1.7
SW2021-02	1,329,108	109%	1,091	109%	-60	-12%	85	107%	60	109%	-1.9
SW2021-03	177,950	81%	149	80%	20	4%	11	84%	8	81%	0.6
SW2021-04	8,086,100	92%	6,739	92%	409	9%	501	93%	369	92%	10.6
SW2021-05	188,400	37%	161	34%	70	0%	10	42%	9	37%	2.0
SW2021-06	591,660	78%	466	75%	79	3%	36	81%	27	78%	2.2
SW2021-07	25,964,000	98%	21,564	98%	468	27%	1,630	98%	1,182	98%	9.7
SW2021-08	106,900	100%	89	100%	1	100%	7	100%	5	100%	0.0
SW2021-09	21,222,800	102%	19,981	102%	-95	-113%	1,345	101%	970	102%	-5.8
SW2021-10	427,000	61%	9,059	1%	5,863	0%	534	3%	473	3%	166.8
SW2021-11	1,022,610	100%	427	99%	7	72%	65	100%	47	100%	0.1
SW2021-12	6,769,840	98%	15,597	99%	94	35%	425	99%	309	98%	1.7
SW2021-13	9,102,000	93%	7,573	93%	413	10%	565	94%	415	93%	10.5
SW2021-14	527,900	53%	452	51%	147	1%	30	58%	24	52%	4.1
SW2021-15	306,370	34%	266	33%	117	0%	17	39%	14	34%	3.3
SW2021-16	1,231,300	87%	1,030	86%	98	5%	76	89%	56	87%	2.6
SW2022-01	17,284,200	77%	9,057	61%	2,375	3%	1,045	81%	791	77%	65.5
SW2022-02	176,000	100%	146	100%	1	100%	11	100%	8	100%	0.0
SW2022-03	355,579	77%	299	76%	49	3%	21	80%	16	77%	1.3
SW2022-04	391,740	71%	592	83%	68	2%	23	75%	18	71%	1.9
UU0178	1,071,100	-108%	1,017	-94%	1,290	0%	42	-175%	49	-107%	36.8
UU0179	168,950	66%	144	64%	34	2%	10	70%	8	66%	1.0
UU0180	657,850	64%	558	62%	141	1%	39	68%	30	64%	3.9
UU0181	1,114,200	0%	991	0%	648	0%	57	0%	51	0%	18.4
UU0182	-75,300	1276%	-8,771	10%	512	-1%	-15	416%	-3	1633%	14.7
UU0183	5,535,050	50%	3,605	32%	1,621	1%	317	55%	299	58%	45.7
UU0184	80,720	7%	71	7%	44	0%	4	9%	4	7%	1.2
UU0185	583,320	0%	518	0%	339	0%	30	0%	27	0%	9.6
UU0186	202,510	50%	174	49%	59	1%	12	55%	9	50%	1.7
UU0187	29,500	51%	25	49%	9	1%	2	56%	1	51%	0.2
UU0188	336,801	0%	346	13%	197	0%	20	12%	19	20%	5.6
UU0189	101,472	39%	154	64%	37	2%	9	64%	10	72%	1.0
UU0190	1,161,100	0%	1,032	0%	676	0%	60	0%	53	0%	19.2
UU0191	629,970	22%	552	21%	286	0%	34	26%	29	22%	8.1
UU0192	1,104,900	0%	983	0%	643	0%	57	0%	51	0%	18.2
UU0194	2,115,600	74%	1,785	73%	323	2%	127	78%	97	74%	9.0
UU0195	376,820	81%	191	66%	44	3%	23	84%	17	81%	1.2
UU0196	78,941	9%	70	8%	42	0%	4	10%	4	9%	1.2
UU0197	18,500	30%	16	28%	8	0%	1	34%	1	30%	0.2
UU0198	375,949	63%	320	61%	83	1%	22	67%	17	62%	2.3
Total	**111,479,710**	**85%**	**98,980**	**52%**	**17,222**	**7%**	**7,324**	**63%**	**5,599**	**94%**	**476**

Table 2 - Annual potential cost and energy savings

Report Number	Recommendations Identified	Gas Savings (MMBtu/yr)	Electric Savings (kWh/yr)	Total Cost Savings	Incremental Recommendation Costs	Simple Payback Period
SW2021-01	3	3,766	145,506	$24,270	$68,560	2.8
SW2021-02	4	12,160	-158,740	$51,560	$443,930	8.6
SW2021-03	5	1,216	46,850	$6,020	$14,760	2.5
SW2021-04	4	62,900	889,700	$267,300	$394,640	1.5
SW2021-05	5	588	165,000	$18,650	$88,400	4.7
SW2021-06	11	3,880	184,060	$25,820	$41,500	1.6
SW2021-07	4	214,520	816,000	$686,920	$11,240,600	16.4
SW2021-08	5	903	0	$128,080	$804,840	6.3
SW2021-09	4	182,570	-485,000	$532,860	$4,530,220	8.5
SW2021-10	4	2,210	13,970,570	$476,740	$3,577,760	7.5
SW2021-11	4	8,642	4,740	$65,790	$383,420	5.8
SW2021-12	5	56,344	145,320	$30,007,640	$37,071,050[1]	1.2
SW2021-13	5	71,470	881,110	$638,220	$7,591,930	11.9
SW2021-14	5	2,345	347,860	$35,110	$71,550	2.0
SW2021-15	6	891	278,840	$30,480	$45,470	1.5
SW2021-16	6	9,059	221,400	$45,190	$226,230	5.0
SW2022-01	7	113,010	5,509,130	$668,815	$814,600	1.2
SW2022-02	3	1,488	0	$7,010	$67,900	9.7
SW2022-03	7	2,295	113,390	$26,105	$51,140	2.0
SW2022-04	6	2,395	210,745	$26,430	$66,415	2.5
UU0178	6	-9,778	3,094,802	$170,253	$352,113	2.1
UU0179	8	941	80,050	$108,004	$23,044	0.2
UU0180	9	3,535	331,430	$44,119	$84,739	1.9
UU0181	5	0	1,546,236	$70,688	$126,290	1.8
UU0182	6	-8,092	1,238,396	$5,585,500	$8,688,460	1.6
UU0183	8	23,540	3,832,860	$431,508	$751,033	1.7
UU0184	6	988	103,790	$34,091	$111,384	3.3
UU0185	7	0	810,370	$40,278	$96,725	2.4
UU0186	6	863	139,480	$18,410	$42,220	2.3
UU0187	4	127	20,200	$12,795	$27,040	2.1
UU0188	6	0	468,300	$107,140	$460,360	4.3
UU0189	6	336	86,045	$34,594	$73,550	2.1
UU0190	5	134,123	1,481,578	$26,895	$23,760	0.9
UU0191	8	1,171	681,960	$39,972	$70,566	1.8
UU0192	8	0	1,535,000	$98,800	$123,430	1.2
UU0194	6	13,300	752,980	$111,290	$244,140	2.2
UU0195	9	2,580	100,350	$46,415	$85,788	1.8
UU0196	6	60	100,065	$17,620	$12,190	0.7
UU0197	7	47	18,080	$50,360	$23,525	0.5
UU0198	5	1,987	195,325	$31,010	$50,630	1.6
Grand Total	234	918,379	39,903,778	$40,848,752	$79,065,902	1.9

[1] StepWise notes that a high-level analysis on an entire vehicle fleet caused the high costs of this assessment.

Table 3 - Assessment facility annual natural gas usage and assessment date

Report Number	NG Usage (MMBtu/yr)	Date of Assessment
SW2021-01	84,165	1/13/2021
SW2021-02	13,041	4/26/2021
SW2021-03	69,370	4/9/2021
SW2021-04	108,187	5/19/2021
SW2021-05	9,606	6/18/2021
SW2021-06	74,053	7/16/2021
SW2021-07	198,419	8/4/2021
SW2021-08	5,841	8/11/2021
SW2021-09	4,306,000	8/17/2021
SW2021-10	4,306,000	8/18/2021
SW2021-11	36,298	9/10/2021
SW2021-12	4,081	9/29/2021
SW2021-13	783,412	10/26/2021
SW2021-14	13,554	11/19/2021
SW2021-15	31,777	11/29/2021
SW2021-16	16,610	12/10/2021
SW2022-01	270,997	1/13/2022
SW2022-02	5,316	2/3/2022
SW2022-03	6,557	2/18/2022
SW2022-04	3,685	2/23/2022
UU0178	N/A - DOE	1/13/2021
UU0179	N/A - DOE	1/27/2021
UU0180	N/A - DOE	2/25/2021
UU0181	N/A - DOE	3/3/2021
UU0182	N/A - DOE	3/26/2021
UU0183	N/A - DOE	3/22/2021
UU0184	N/A - DOE	5/13/2021
UU0185	N/A - DOE	5/26/2021
UU0186	N/A - DOE	6/3/2021
UU0187	N/A - DOE	6/17/2021
UU0188	N/A - DOE	7/1/2021
UU0189	N/A - DOE	7/15/2021
UU0190	N/A - DOE	8/18/2021
UU0191	N/A - DOE	8/12/2021
UU0192	N/A - DOE	9/22/2021
UU0194	N/A - DOE	10/26/2021
UU0195	N/A - DOE	11/10/2021
UU0196	N/A - DOE	11/16/2021
UU0197	N/A - DOE	1/4/2022
UU0198	N/A - DOE	1/21/2022

ASSESSMENT ANALYSIS

Over the 40 assessments completed in FY2021, the IIAC tracked trends in the customers served, recommendations identified, and recommendations implemented.

Customers

In evaluating customers served, it is noted that StepWise assessments were evenly split between commercial and industrial assessments. 10 assessments were for industrial customers, and 10 were for commercial customers. While the number of recommendations identified were also an approximate split, industrial recommendation savings for natural gas and electricity accounted for approximately 3/4 of the total StepWise savings identified.

As noted above, the StepWise program expands services not only to commercial customers but also to various DEU rate schedule customers. DEU customers are typically on either a general service (GS), fixed service (FS), or transportation service (TS) rate schedule. Only GS customers are eligible to participate in DEU's ThermWise incentive program. The breakdown for StepWise customers is shown in Table 4.

Table 4 – StepWise Customers by Rate Schedule

Rate Schedule	Percent of Assessments
TS	75%
GS	15%
FS	5%
Mixed (FS/GS, TS/GS, FS/TS)	5%

Recommendations

In analyzing the 234 total potential recommendations to date (103 through StepWise and 131 through DOE) the IIAC has identified through assessments, observations of eight types of recommendations were noted and summarized in Tables 5 and 6. The categories encapsulate topics and equipment where most recommendations may be related. For example, boiler recommendations may include boiler controls upgrades, retrofits, replacements, or other changes to a facility's boiler system. Recommendations consider innovative solutions, energy efficiency improvements, as well as recommendations to bring older systems up to current best practices.

Table 5 – Recommendation type definitions

Recommendation Type	Recommendation Description
Boiler	Directly impacts a boiler or boiler system's operation
Cogeneration	Directly impacts an existing or proposed cogeneration system
Compressed Air	Directly impacts a compressed air system
Electricity/Other	Impacts electricity driven equipment outside of the other listed categories or other recommendations which fall outside the scope of this list
HVAC	Directly impacts a facility's system for heating, ventilation, or air conditioning their buildings; not process-related
Other gas	Recommendations which reduce natural gas and do not impact the other systems on this list

RNG	Directly related to the production or use of renewable natural gas in a facility
Water	Directly related to water systems or water reductions

Table 6 – Results broken down by recommendation type

Recommendation Type	Percent of Total Recommendations	Percent of Total Natural Gas Savings	Average Simple Payback Period	Potential Criteria Pollutant Reductions (ton/yr)	Potential Equivalent CO2 Reductions (ton/yr)
Boiler	19%	54%	11.6	19.8	21,591
Cogeneration	2%	19%	8.2	11.7	10,778
Compressed Air	16%	0%	0.8	1.9	1,239
Electricity/other	29%	0%	4.6	13.6	3,820
HVAC	20%	12%	2.2	6.1	6,923
Other gas	10%	9%	1.5	8.4	8,321
RNG	3%	6%	1.3	3.0	2,874
Water	1%	0%	3.2	0.3	188

It is noted that HVAC and other natural gas[2] recommendations provide the most natural gas savings with the shortest payback periods. These are often recommendations that involve an easily implemented controls change with no capital investment. While boiler retrofit and replacement recommendations made up the majority of the natural gas savings identified, these recommendations had higher costs and longer payback periods on average. Boiler and cogeneration recommendations may not be achievable for customers without outside funding due to the longer payback periods.

Recommendation types with a higher percentage of the overall natural gas savings result in higher potential emissions reductions. The exception to this being the electricity/other[3] recommendations, which have the second largest amount of criteria pollutant reductions. This is likely due to the sulfur dioxide emissions that are reduced from preventing electricity generation with coal sources.

Several recommendations identified by the IIAC provide good examples of high impact natural gas efficiency recommendations which may need further funding assistance for the customer to move forward. Note that while these recommendations have been identified, further development is required. In partnership with Dominion Energy, the IIAC anticipates determining the process and selection of recommendations to propose for approval for the annual report.

Implementation

The IIAC has a practice of contacting customers approximately 300 days after DOE report delivery to check in on implementation and provide any further assistance the customer may require. Based on these outreach efforts, the IIAC has a historical implementation rate of 57% of assessment recommendations. Twelve of the DOE assessments have completed implementation surveys with the following results:

[2] "Other gas" may include any recommendation not directly related to building space heating or boiler natural gas use, such as oven or furnace improvements.
[3] "Electricity/other" recommendations refer to any recommendation that did not save natural gas which may include electricity efficiency recommendations or adjusting utility rate schedules,

Table 7 – Implementation results for recent DOE assessments

Report Number	Recommendations Implemented	Capital Recommendations	Operating Recommendations	Other
UU0178	0%	0%	0%	0%
UU0179	33%	33%	67%	0%
UU0180	44%	25%	75%	0%
UU0181	80%	75%	25%	0%
UU0182	50%	67%	33%	0%
UU0183	50%	75%	25%	0%
UU0184	17%	100%	0%	0%
UU0185	57%	50%	50%	0%
UU0186	67%	25%	75%	0%
UU0187	25%	0%	100%	0%
UU0188	50%	67%	0%	33%
UU0189	50%	0%	67%	33%

Average implementation based on these twelve assessments is 44%, which is slightly lower than the IIAC's average historical rate. Capital recommendations require large investments to complete, while operating recommendations include controls changes, reducing equipment operation, and smaller maintenance projects. The other distinction typically refers to a recommendation around billing or fees, which saves the customer money but does not directly require operating changes or capital investment. On average, the implemented recommendations had an even split between those which were capital verses operating recommendations.

StepWise has developed a plan and a dedicated survey to evaluate recommendation implementation. Either 300 days after the report is delivered or 1 year after the assessment is completed (whichever is shorter), the customer will be contacted to see whether recommendations have been implemented, are in progress, or have been rejected. Due to the longer time frame of many StepWise recommendations, it is expected the initial implementation rate may seem lower than the IIAC assessments. StepWise plans to check in with customers on a semi-annual basis after the initial 300-day period to determine the implementation of certain recommendations. The FY2022 annual report will include implementation rates for StepWise recommendations and an analysis of the types of recommendations implemented.

While DEU does not track specific implementation rates for their ThermWise custom energy efficiency recommendations, they have confirmed that 48% of their customers have participated in at least one unique measure.

PROGRAM ANALYSIS

Throughout the year, DEU and University of Utah met with regulators and took input and feedback on quarterly reporting. Reports were delivered as follows:

- 2021 Q2 Report – Delivered on 8/23/2021, 5/20 assessments completed
- 2021 Q3 Report – Delivered on 12/3/2021, 12/20 assessments completed
- 2021 Q4 Report – Delivered on 3/4/2022, 16/20 assessments completed
- 2022 Q1 Report – Delivered on 5/24/2022, 20/20 assessments completed

Topics of feedback discussion included secondary electricity air emission factors sources and approach, impacts of energy efficiency on air quality in Utah, current limits (that extend beyond the scope of the program) on air quality data with respect to location and clarification of assessment focus (natural gas efficiency and natural gas innovation, including renewable natural gas).

In effort to be responsive to feedback discussions, the IIAC has implemented a more conservative approach to secondary electricity-associated air emissions (noting that electric efficiency recommendations are secondary to natural gas recommendations and simply a good faith effort to benefit the customer's economic viability). The adoption of new calculation methods to reflect the more conservative approach and most recent air emission factors available have resulted in some adjustment to the air quality numbers shown in the annual report verses previous quarterly reports. One ongoing effort that is not yet reflected in this annual report is to update VOC and NH3 emissions factors from the National Emission Inventory (NEI) 2017 with new power plant data from the Environmental Protection Agency's (EPA) eGRID 2020. All other emission factors have been updated with the eGRID 2020 data. Updates will be finalized in time for the second quarterly report of 2022.

Program Outreach and Marketing

IIAC has been actively promoting awareness of StepWise program opportunity to the community. Examples include a March 2021 Utah Association of Energy Users presentation to introduce and promote the StepWise program to some of Utah's largest energy users (also primarily TS rate customers). In October 2021, IIAC personnel attended the One Utah Summit in Cedar City, Utah to network with rural Utah businesses. On January 6th, 2022, IIAC members attended the School Board Annual Conference to connect with school districts across the state. As a result of the outreach to school districts, the IIAC has performed two assessments at school districts and have three scheduled in the new fiscal year. On February 1st, 2022, the StepWise program presented to the Utah Air Quality Board to share their efforts to improve Utah air quality and connect with new customers. The Utah Air Quality Board provided positive feedback, including from Salt Lake City Mayor Erin Mendenhall. The IIAC will present to the Water Environment Association of Utah Annual Conference on April 13th, 2022 to reach out to wastewater and water reclamation facilities.

In addition to promoting program awareness, nearly all of the largest Universities in Utah have been contacted and informed of the program's opportunities. Facility management teams for Weber State University and Brigham Young University were contacted in the second quarter of 2021. In the third quarter, the energy management team for Utah State University was contacted and informed of the program and its potential opportunities. In addition to these introductions, Weber State University and Utah State University participated in energy assessments and clean air assessments for several of their campus facilities. While the University of Utah is the only Department of Energy competitively selected and approved

university in Utah to perform industrial energy assessments, efforts to engage with these other Universities in Utah are ongoing. To date, no STEP project proposals have been presented to Dominion Energy by other Universities.

COVID-19 Impacts

Dominion Energy is actively monitoring the development of COVID-19. Related, the start date of the IIAC pilot program was shifted to March 1, 2021. During the emergence of the Omicron variant in the 4th quarter, the IIAC and DEU have increased their diligence, but no further program impacts have been experienced to date.

Financial Summary

The annual program budget expenditures are summarized in this section.

Table 8- Total expenditures by quarter

[redacted]

Table 9 – Itemized expenditures by month

[redacted]

** Note: Facilities & Administration (F&A) costs are "incurred for common or join objectives and therefore cannot be identified readily and specifically with a particular sponsored project, an instruction activity, or any other institutional activity" (Utah.edu, 2021). Examples of these types of indirect or allocated costs include: 1) Operating and maintenance costs such as utility, security, and custodial costs, 2) Common administrative functions such as payroll and purchasing, and 3) Sponsored project administration. For more details regarding F&A costs and the 2021 approved F&A rates, visit: https://osp.utah.edu/resources/quick-reference/fa-rates.php

[4] Some initial marketing and outreach activities were completed in the months leading up to March 2021.

Table 10 - Invoice history

Invoice #	Date	Quarter	Amount	Status
UU-00219816	3/2021	Q1 2021	$100,000	Paid
UU-00226570	6/2021	Q2 2021	$100,000	Paid
UU-00238654A	10/2021	Q3 2021	$100,000	Paid
UU-00238654	1/2022	Q4 2021	$100,000	Paid

Table 11 - Status to Bonus Payments

Bonus #1: Following completion of 16 energy and clear air assessments	**$100,000**
100% completed	Pending
Bonus #2: Following completion of 40 energy and clean air assessments	$100,000
40% completed	Not Paid

CONCLUSIONS

Based on the experience of the pilot program's first year, IIAC has a number of conclusions and observations related to customers, sectors, recommendations and marketing/program outreach.

Customers/Sectors

The following sectors had the greatest savings opportunities for both emissions and energy reductions:

- Private manufacturers
- Universities
- Wastewater treatment plants
- Government entities

One sector representation that emerged toward the end of the fiscal year is hospitals. IIAC performed two assessments at hospitals in the most recent quarter and found a large number of opportunities at both. Future outreach may include Utah hospitals, especially those without the resources for energy management staff.

Recommendations

The IIAC found that RNG and boiler opportunities typically had the best energy and emissions savings for the cost of the recommendation. Most RNG opportunities were identified at wastewater treatment plants, as they have a readily available source of biogas. These will continue to be target opportunities in the next year.

Program Outreach and Marketing

IIAC will continue to pursue marketing and outreach options that offer program access equity. In particular, IIAC has found introducing the StepWise program at conferences to be a successful method of outreach. It is likely that the IIAC will continue to stay involved in local and regional conferences to continue to advertise both the DOE and StepWise services that the IIAC provides.

Future Goals

The IIAC is excited to continue their assessment of Utah facilities for energy and air quality improvements in the next year. Using the lessons learned and data collected in the first year of the pilot program, the IIAC will target assessments that will better maximize the forward-facing recommendations this program was originated to identify.

APPENDIX: ESTIMATING EMISSIONS

Utah Air Quality Challenges

Utah faces three key air quality challenges. First, Utah's Wasatch Front experiences periodic episodes of elevated fine particulate pollution matter ($PM_{2.5}$) during the winter.[5] Because of these episodes, the United States Environmental Protection Agency (US EPA) classifies Utah's Wasatch Front Valley as non-attainment regions for failure to meet the 24-hour $PM_{2.5}$ ambient air quality standard.[6] These pollution episodes are caused by a combination of local emissions, mountainous topography, and meteorology. During winter, cold air settles in our mountain valleys, and warm air traps this cold air as well as all the pollution. Locally, this is known as an "inversion". The only realistic strategy for addressing these pollution episodes is to reduce direct emissions of $PM_{2.5}$ and $PM_{2.5}$ precursors (NO_x, SO_x, VOCs, and NH_3. Recent emission reductions have been leading to improvements in air quality in these nonattainment areas. In fact, these emission reductions, combined with favorable winter-time weather conditions, have led the EPA to announce its intention to redesignate this area as $PM_{2.5}$ maintenance areas. This redesignation is anticipated to occur in 2022. However, population growth and the accompanying emission increases will likely continue to put pressure on these constrained airsheds.

Second, Utah's Uinta Basin's experiences elevated levels of ozone during the winter, and it is currently classified as a non-attainment area for ozone.[7] [8] The topography, meteorology, and emissions from oil and gas development have led to elevated levels of ozone. Researchers, the state, and oil and gas developers have been working to understand and address the causes of winter-time ozone in this region.

Third, Utah's Wasatch Front was recently declared as nonattainment for ozone. This non-attainment designation divides the Wasatch front into two regions, the Northern Wasatch, and Southern Wasatch Front. Utah's Wasatch Front experiences elevated levels of ozone during the summer, and this is a result of sunlight, warm temperatures, and regional and local emissions of NO_x, CO and VOCs. The state is currently in the process of developing plans to bring these areas into compliance with the National Ambient Air Quality standards for ozone.

Calculation of Emission Savings

StepWise personnel estimated the changes in emissions associated with the ARs. These changes included reduction in natural gas and electricity usage. Natural gas usage occurs on site, and the associated emission reductions are estimated using EPA's AP-42 emission factors. These emissions factors quantify emissions based on the type of equipment used to combust the natural gas. If the facility is located in the Wasatch Front ozone nonattainment modeling domain, the emissions savings during the months of May to September will benefit the Wasatch Front ozone non-attainment areas. If the emissions savings occur during the months of November through February, these savings will benefit the Wasatch Front $PM_{2.5}$ nonattainment area.

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[5] https://deq.utah.gov/air-quality/pm-2-5-serious-sips-2017-2019
[6] https://www.epa.gov/green-book/green-book-8-hour-ozone-2015-area-information
[7] https://deq.utah.gov/air-quality/ozone-in-the-uinta-basin
[8] https://www.epa.gov/green-book/green-book-8-hour-ozone-2015-area-information

Recommendations that reduce electricity usage will result in grid-level emissions savings (i.e. at the location of electric power generation), which may have varying air-quality impacts depending on the resource mix used to produce the electricity. Consequently, StepWise presents a range of emission savings from two EPA tools: eGrid 2019 NWPP (WECC Northwest)[9] and from AVERT 2021 (Northwest)[10]. EPA's eGrid captures annual emissions, whereas AVERT captures the dynamics of electricity dispatch based on the historical patterns of actual generation. Since eGrid does not contain NH_3 and VOC emissions, StepWise used the 2017 National Emission Inventory (NEI) data (the most recent year available) and adjusted these to 2019 emissions based on electricity generation. Specifically, StepWise assumes that the emission rate for each power plant in 2019 is similar to 2017. Using the amount of electricity generation for each unit in 2019, StepWise then estimates the 2019 emission factor (lb/MWhr). Table A-1 summarizes electricity generation emission factors.

Table A-1: Electricity-Associated Emissions Factors

Source	Electricity Generated (MWh)	$CO_{2,e}$ (lb/MWhr)	NOx (lb/MWhr)	$PM_{2.5}$ (lb/MWhr)	SO_2 (lb/MWhr)	VOC (lb/MWhr)	NH3 (lb/MWhr)
eGrid	282,811,235	720	0.640	0.037	0.419	0.0727	0.0119
AVERT	132,302,510	1576	1.09	0.084	0.721	0.033	0.018

Emissions Equivalents

The average CO_2 emissions for driving one mile in a typical passenger vehicle in the US is 0.891 lbs .[11] A light duty gasoline vehicle emits 0.000637 lbs NOx/mile.[12] Annual CO_2 emissions from a typical US home are 19,114 lbs.[13] Annual NOx emissions from a home in the United States are 9 lbs (due to energy consumption).[14] Average electricity use per home in the United States is 12146 kWh.[15] Table A-2 summarizes the emission equivalents.

Table A-2: Emissions Equivalents

Emissions	Miles Driven (lbs/mi)	Homes Heated
CO2	0.891	19,114.08
NOx	0.000637	9
kWh		12,146

Natural Gas Combustion

Any energy efficiency measure that reduces combustion of natural gas will result in air quality improvement by directly reducing emissions of combustion products. Emissions savings for direct gas reduction are determined using EPA's AP-42 emission factors[16]. This publication compiles air pollutant emission factors for many air-pollution sources, including natural-gas fired boilers and heaters. These emission factors differ depending on the maximum firing rate, the firing configuration, and pollution control technologies. For each AR, StepWise personnel estimated emission reductions by applying the appropriate AP-42 emission factor. A summary of example emission factors from the AP-42 document are shown in Table A-3.

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[9] https://www.epa.gov/egrid
[10] https://www.epa.gov/avert
[11] https://www.epa.gov/greenvehicles/greenhouse-gas-emissions-typical-passenger-vehicle
[12] https://www.bts.gov/content/estimated-national-average-vehicle-emissions-rates-vehicle-vehicle-type-using-gasoline-and
[13] https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references
[14] https://www.epa.gov/sites/production/files/201812/documents/power_profiler_terms_calculations_and_data_sources_12-1-2018.pdf
[15] https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references
[16] https://www3.epa.gov/ttn/chief/ap42/ch01/final/c01s04.pdf

Table A-3: EPA AP-42 Boiler emission factors for a small natural gas boiler with low-NOx/FGR

Emission Metric	Emission Factor
CO_2 equivalent[17]	120,000
NO_x	32
SO_2	0.6

If facility monthly natural gas consumption is available and a facility is located in the Wasatch Front non-attainment zone, then StepWise calculates winter-time $PM_{2.5}$ emissions. If an AR affects a natural gas load that varies with temperature, monthly natural gas savings are scaled by average monthly temperature. The average monthly temperature is found for cities in Utah using weather.gov. Because the colder months correlate with higher natural gas usage, the difference between the hottest month and and each individual month is used to scale the natural gas savings. This causes the months with very low average temperatures to have proportionally more natural gas savings per month than the months with high average temperatures. If an AR affects a natural gas load that does not vary with temperature, the natural gas savings are divided evenly among the 12 months and are not scaled with average monthly temperature. This allows for more accurate calculations of actual natural gas savings.

Maps indicating Utah Air Quality Non-attainment Areas and Modeling Domain

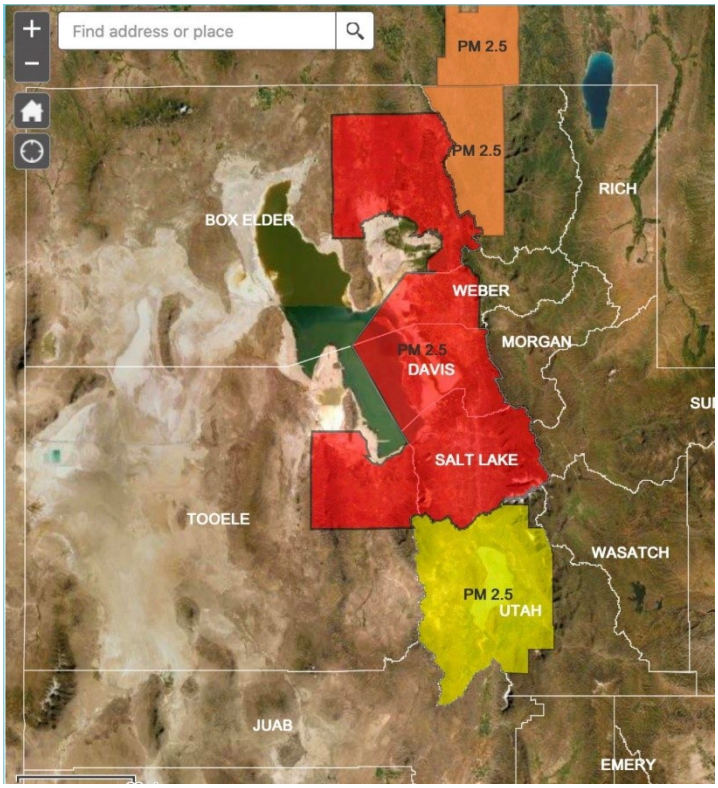

Figure A-1: Logan/Franklin (orange), Provo (yellow), and Salt Lake County (red) PM2.5 non-attainment areas. Note that Logan/Franklin and Provo have been reclassified as non-attainment maintenance areas.

[17] Carbon dioxide equivalent means the number of metric tons of CO2 emissions with the same global warming potential as one metric ton of another greenhouse gas.

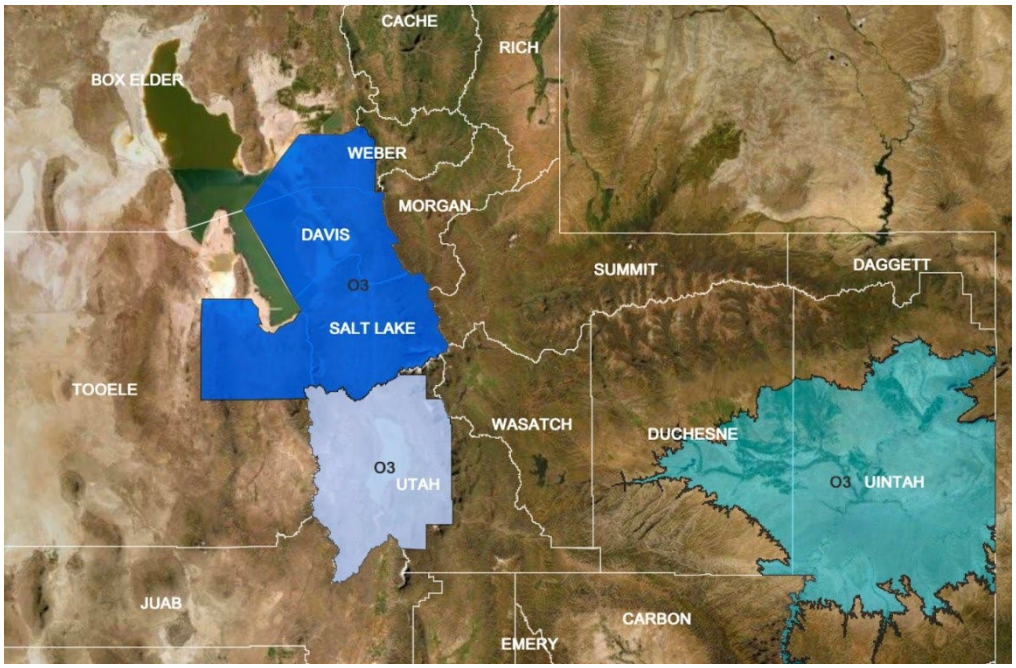

Figure A-2: Northern (dark blue) and Southern (light blue) Wasatch, Front and Uintah basin (turquoise) ozone non-attainment areas.

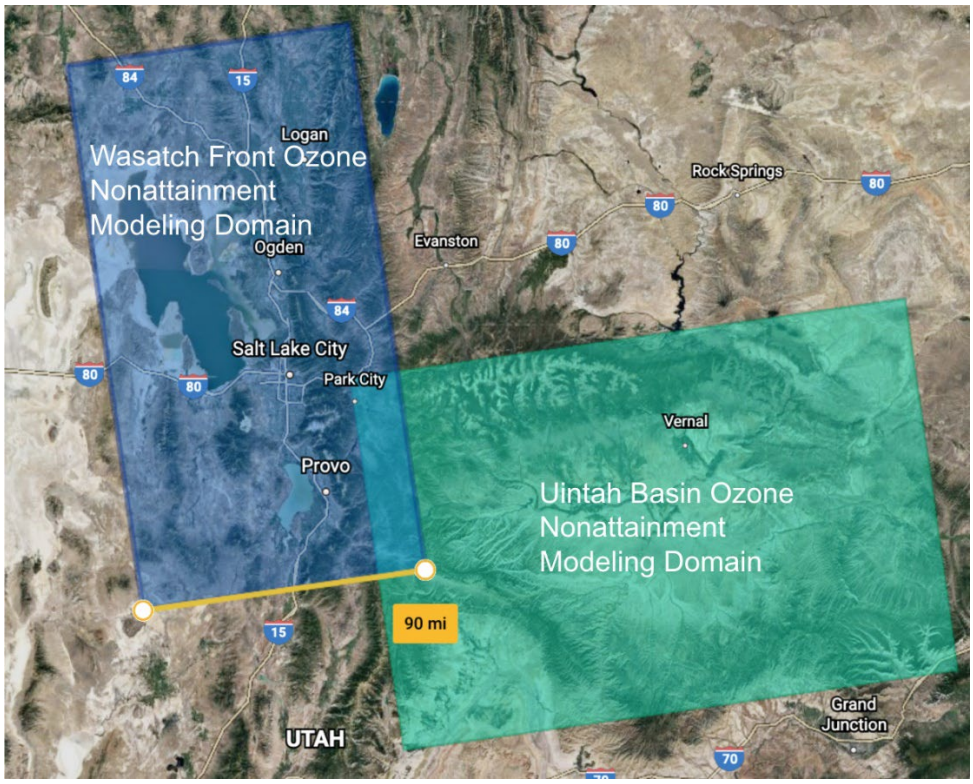

Figure A-3: Wasatch Front (blue) and Uintah basin (green) ozone non-attainment modeling domains. The boundaries of these domains exceed the non-attainment areas because emissions from the modeling domains influence ozone levels in the non-attainment areas. This domain was provided courtesy of the Utah Division of Environmental Quality, March 2021.