
Low Income CIP Program Assessment

Process Evaluation of IOU Programs
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Table of Contents

Table of Contents.....	1
List of Tables.....	5
Acronyms	8
Executive Summary.....	9
Low-Income Program Context.....	9
Analysis Framework	11
Natural Gas IOU Low-Income Programs.....	11
CenterPoint Energy (CPE).....	12
Xcel Energy (Xcel).....	12
Minnesota Energy Resources Corporation (MERC)	13
Great Plains Natural Gas (GPNG)	13
Greater Minnesota Gas (GMG).....	14
Summary of Natural Gas IOU Low-Income Programs.....	14
Electric IOU Low-Income Programs.....	16
Xcel Energy (Xcel).....	16
Minnesota Power (MNP)	17
Otter Tail Power (OTP).....	17
Summary of Electric IOU Low-Income Programs.....	17
Program Assessment Framework.....	19
Assessment of IOU Low-Income Programs	20
Explicit Program Requirements	20
Implicit Program Objectives.....	21
Low-Income Program Best Practices	22
Recommendations	24
Explicit Program Requirements	24
Implicit Program Objectives.....	25
Low-Income Program Best Practices	27
1.0 Introduction	30
1.1 Methodology.....	30

1.2 Organization of the Report.....	31
2.0 Low-Income Program Context.....	33
2.1 Income-Eligible Households	33
2.2 EAP Program.....	37
2.3 WAP Program	39
2.3.1 WAP – Eligible Housing Units and Eligible Program Measures.....	40
2.3.2 WAP – Quality Control and Health and Safety Guidelines.....	41
2.4 Summary of Low-Income Program Information	42
3.0 Analysis Framework	44
3.1 Program Investments	44
3.2 Program Characteristics	44
3.2.1 Market Segment	45
3.2.2 Program Delivery Procedures	46
3.2.3 Energy Efficiency Measures	48
3.3 Program Performance	49
3.4 Analysis Framework	51
4.0 Natural Gas IOU Low-Income Programs.....	52
4.1 CPE Natural Gas LI CIP Programs.....	52
4.2 Xcel Natural Gas LI CIP Programs	57
4.3 MERC LI CIP Programs	60
4.4 Great Plains Natural Gas LI CIP Programs	63
4.5 Greater Minnesota Gas LI CIP Programs	66
4.6 Summary Information on IOU Natural Gas Programs.....	68
4.6.1 Comprehensive Single Family Home Programs	69
4.6.2 Other IOU LI CIP Programs.....	73
4.6.3 Summary of Findings.....	76
5.0 Electric IOU Low-Income Programs	78
5.1 Xcel Electric LI CIP Programs	78
5.2 Minnesota Power LI CIP Programs	82
5.3 Otter Tail Power LI CIP Programs	84
5.4 Summary Information on IOU Electric LI CIP Programs	86

5.4.1 Comprehensive Single Family Programs.....	86
5.4.2 Other Programs.....	89
5.6.3 Summary of Findings.....	90
6.0 Assessment Framework.....	91
6.1 Explicit Program Requirements.....	91
6.2 Implicit Program Objectives	93
6.3 Low-Income Program Best Practices.....	94
6.4 Program Assessment Framework.....	95
7.0 Assessment of Natural Gas IOU Programs	97
7.1 Explicit Program Requirements.....	97
7.1.1 LI CIP Spending Requirement.....	97
7.1.2 Reporting Requirements.....	98
7.1.3 Department Guidance on Multifamily Buildings	100
7.2 Implicit Program Objectives	101
7.2.1 Serving Low-Income Renters	102
7.2.2 Making Use of WAP Protocols	102
7.3 Low-Income Program Best Practices.....	104
7.3.1 Collaboration with EAP and WAP	105
7.3.2 Measurement and Evaluation Strategy	107
7.3.3 Program Targeting	109
7.4 Summary of Findings	110
8.0 Assessment of Electric IOU Programs	112
8.1 Explicit Program Requirements.....	112
8.1.1 LI CIP Spending Requirement.....	113
8.1.2 Reporting Requirements.....	113
8.1.3 Department Guidance on Multifamily Buildings	114
8.1.4 Department Guidance on Delivered Fuel and Natural Gas	115
8.2 Implicit Program Objectives	115
8.2.1 Serving Low-Income Renters	116
8.2.2 Making Use of WAP Protocols	117
8.3 Low-Income Program Best Practices.....	118

8.3.1 Collaboration with EAP and WAP	119
8.3.2 Measurement and Evaluation Strategy	121
8.3.3 Program Targeting	122
8.4 Summary of Findings	123
9.0 Recommendations	125
9.1 Explicit Program Requirements.....	125
9.2 Implicit Program Objectives	125
9.3 Low-Income Program Best Practices.....	127

List of Tables

Table 1. 2014 Natural Gas LI CIP Program Summary	14
Table 2. Comprehensive Single Family Natural Gas LI CIP Programs.....	15
Table 3. Other Natural Gas LI CIP Programs	15
Table 4. 2014 Electric LI CIP Program Summary	18
Table 5 Comprehensive Electric LI CIP Programs.....	18
Table 6. – Specialty Electric LI CIP Programs.....	19
Table 7. Number and Percent of EAP and WAP Income-Eligible Households in 2015	34
Table 8. Number and Percent of WAP Income-Eligible Households in 2015 by Housing Unit Type and Ownership Status.....	34
Table 9. Number and Percent of WAP Income-Eligible Households in 2015 by Housing Unit Type and Ownership Status.....	35
Table 10. Number and Percent of WAP Income-Eligible Households in 2015 by Housing Unit Type and Main Heating Fuel ^a	35
Table 11. Number and Percent of WAP Income-Eligible Households in 2015 by Housing Unit Type and Main Heating Fuel ^a	36
Table 12. LIHEAP Funding and Participants by Program for FFY 2016.....	38
Table 13. Number and Percent of EAP Recipients by Main Heating Fuel in FFY 2016	39
Table 14. CPE LI CIP Program Summary – 2014	53
Table 15. CPE LI CIP Program Targeting, Design, and Implementation	54
Table 16. CPE LI CIP Program Measures	55
Table 17. CPE LI CIP Program Accomplishments.....	56
Table 18. Xcel Natural Gas LI CIP Program Summary - 2014	57
Table 19. Xcel Natural Gas LI CIP Program Targeting, Design, and Implementation.....	58
Table 20. Xcel Natural Gas LI CIP Program Measures.....	59
Table 21. Xcel Natural Gas LI CIP Program Accomplishments	60
Table 22. MERC Natural Gas LI CIP Program Summary - 2014	61
Table 23. MEC Natural Gas LI CIP Program Targeting, Design, and Implementation.....	62
Table 24. MERC Natural Gas LI CIP Program Measures.....	62
Table 25. MERC Natural Gas LI CIP Program Accomplishments	63

Table 26. GPNG Natural Gas LI CIP Program Summary - 2014	64
Table 27. GPNG Natural Gas LI CIP Program Targeting, Design, and Implementation - 2014.....	65
Table 28. GPNG Natural Gas LI CIP Program Measures.....	65
Table 29. GPNG Natural Gas LI CIP Program Accomplishments	66
Table 30. GMG Natural Gas LI CIP Program Summary – 2014.....	67
Table 31. GMG Natural Gas LI CIP Program Targeting, Design, and Implementation	67
Table 32. GMG Natural Gas LI CIP Program Measures	67
Table 33. GMC Natural Gas LI CIP Program Accomplishments.....	68
Table 34. 2014 Natural Gas LI CIP Program Summary	68
Table 35. Comprehensive Natural Gas Single Family LI CIP Programs	70
Table 36. Comprehensive Natural Gas Single Family LI CIP Program Targeting, Design, and Implementation	71
Table 37. Comprehensive Natural Gas Single Family LI CIP Eligible Measures.....	73
Table 38. Other Natural Gas LI CIP Programs	74
Table 39. Other Natural Gas LI CIP Program Targeting, Design, and Implementation	75
Table 40. Other Natural Gas LI CIP Program Eligible Measures.....	76
Table 41. Xcel Electric LI CIP Program Summary - 2014	78
Table 42. Xcel Electric LI CIP Program Targeting, Design, and Implementation	79
Table 43. Xcel Electric LI CIP Program Measures	81
Table 44. Xcel Electric LI CIP Program Accomplishments	81
Table 45. – MNP Electric LI CIP Program Summary - 2014	82
Table 46. MNP Electric LI CIP Program Targeting, Design, and Implementation	83
Table 47. MNP Electric LI CIP Program Measures.....	83
Table 48. MNP Electric LI CIP Program Accomplishments.....	84
Table 49. OTP Electric LI CIP Program Summary - 2014	84
Table 50. OTP Electric LI CIP Program Targeting, Design, and Implementation	85
Table 51. OTP Electric LI Program Measures	85
Table 52. OTP Electric LI CIP Program Accomplishments	86
Table 53. 2014 Electric LI CIP Program Summary	86
Table 54. Comprehensive Electric Single Family LI CIP Programs.....	87

Table 55. Comprehensive Electric Single Family LI CIP Program Targeting, Design, and Implementation	88
Table 56. Comprehensive Electric Single Family LI CIP Eligible Measures	88
Table 57. Other Electric LI CIP Programs.....	89
Table 58. Other Electric LI CIP Program Targeting, Design, and Implementation	89
Table 59. Other Electric LI CIP Program Eligible Measures	90
Table 60. 2014 Natural Gas IOU LI CIP Planned and Actual Spending	98
Table 61. 2014 Natural Gas IOU Low-Income and Renter Participation in CIP Programs	99
Table 62. Natural Gas IOU LI CIP Program Design	106
Table 63. 2014 Electric IOU LI CIP Planned and Reported Spending	113
Table 64. 2014 Electric IOU LI CIP Low-Income and Renter Participation in CIP Programs.....	114
Table 65. Electric IOU LI CIP Program Design.....	120

Acronyms

C&I – Commercial and Industrial
CAP – Community Action Partnership
CIP – Conservation Improvement Program
COU – Community-Owned Utility
CPE – CenterPoint Energy
Department – the Minnesota Department of Commerce
EAP – Energy Assistance Program
EM&V – Evaluation, Measurement and Verification
ERR – Energy Related Repair
ESP – Energy Savings Platform
FFY – Federal Fiscal Year
GPNG – Great Plains Natural Gas
GMG – Greater Minnesota Gas
HES – Home Energy Squad
HESP – Home Energy Savings program
HHS – United States Department of Health and Human Services
LI – Low Income
LI-CIP – Low-Income Conservation Improvement Program
LI-HES – Low Income Home Energy Squad
LIHEAP – Low income Home Energy Assistance program
LIRC – Low Income Rental Certification
MERC – Minnesota Energy Resources Corporation
MESP – Multi-Family Energy Savings program
MNP – Minnesota Power
NEAT – National Energy Audit Tool
OTP – Otter Tail Power
WAP – Weatherization Assistance Program

Executive Summary

The purpose of this study is to conduct a comprehensive assessment of the Conservation Improvement Program (CIP) services delivered to low-income households by Minnesota's Investor-Owned Utilities (IOUs) with the goal of helping the Department of Commerce (Department) and the IOUs to identify ways to increase the efficiency and effectiveness of those programs. The assessment included:

- Development of an assessment framework that compares IOU program performance to explicit CIP statutory and regulatory requirements, implicit public policy objectives, and low-income energy efficiency program best practices.
- Documentation of the context in which CIP low-income programs are implemented by developing information on low-income households and housing units, and the ways that publicly-funded low-income energy assistance and energy efficiency programs serve those households and housing units.
- Collection of information about each IOU's low-income CIP programs, characterization of the design and implementation of those programs, analysis of the program performance statistics, and identification of unique program designs or approaches that could be replicated by other IOUs.
- Assessment of whether the overall investment by IOUs and their ratepayers in low-income programs are meeting explicit regulatory requirements, fulfilling implicit public policy objectives, and taking advantage of low-income program best practices.
- Identification of opportunities for the Department and the IOUs to undertake initiatives that could enhance the performance of the IOU low-income programs.

The purpose of this report is to furnish the study findings and recommendations. The report is designed to complement the information contained in the report titled *IOU CIP Low-Income Spending Requirements – Regulatory and Policy Analysis* that documents the regulatory framework for IOU low-income programs. This report is limited to analysis of IOU programs serving low-income households; there is a separate report on programs implemented by community-owned utilities (i.e., electric cooperatives and municipal utilities).

Low-Income Program Context

The CIP statute requires electric and natural gas IOUs to spend funds on low-income programs. The statute defines "low-income programs" as "energy conservation programs that directly serve the needs of low-income persons, including low-income renters." The statute does not furnish a specific definition of "low-income persons." Many of the IOUs use the state's WAP and EAP income guidelines to determine eligibility for low-income programs.

The Department has encouraged IOUs to work with WAP service delivery agencies in the design and implementation of their low-income programs. All the IOUs except for Greater Minnesota Gas (GMG)

currently contract with WAP service providers to deliver one or more of their programs. A review of plan filings and decisions also shows that, in some cases, the Commissioner has ordered an IOU to follow the state's WAP guidelines in implementing a low-income program even when that program was not implemented by a WAP service provider.

Since many IOU programs use EAP or WAP income guidelines and have adopted WAP program protocols, it is important to have information on the EAP and WAP programs to understand the rationale for IOU program designs. In addition, it is useful to have statistics on those programs to understand more about the ways that the publicly funded and ratepayer-funded programs can collaborate. This report includes information on:

- **Income-Eligible Households** – It documents EAP and WAP income guidelines and furnishes estimates of the number of income-eligible households, along with statistics on housing unit types and main heating fuels for income-eligible households.
- **EAP and WAP Programs** – It furnishes information on the program guidelines, program spending, and program participants for each of the programs.

Key findings from that analysis of income-eligible households and the EAP and WAP programs include:

- **Low-Income Households** – The EAP and WAP programs clearly define the households that are income-eligible for their programs. The American Community Survey data for 2015 show that there are about 508,000 households that are income-eligible for those programs. That is about 24 percent of Minnesota's 2.15 million households.
- **Low-Income Housing Units** – Some important statistics about the housing units occupied by low-income households include: 50 percent are in single family homes and 36 percent are in large multifamily buildings; 57 percent are occupied by renters, but the share of units occupied by renters varies considerably by housing unit type; about 55 percent of low-income housing units use natural gas as their primary heating source and 27 percent use electricity as their primary heating source.
- **EAP Program** – In FFY 2016, the EAP program served over 134,000 households with its heating assistance program, about 26 percent of all income-eligible households. The program also serves low-income households with an equipment repair and replacement program and a program that delivers energy education and budget counseling to clients, and by transferring funds to WAP.
- **WAP Program** – In a recent program year, the state WAP program had \$20.2 million available to train and monitor WAP program staff, and to deliver services to 1,782 low-income households. The Department's WAP unit has developed detailed information on eligible housing units, service delivery quality control procedures, and client health and safety measures to guide the use of program funds.

The IOUs' low-income programs can take advantage of these resources as they design and implement their low-income programs. However, it also is important for IOU program managers to understand how WAP program guidelines might limit the flexibility for IOU programs that combine resources with WAP

funds, and to actively work with the Department's WAP office and local service providers to ensure that IOU funds are used in the most effective way possible.

Analysis Framework

Each of the IOUs has developed a unique set of LI CIP programs designed to meet the needs of low-income customers in their service territory. To develop a better understanding of each IOU's low-income programs and to help make comparisons among the IOU low-income program portfolio, we developed a common analysis framework. For each IOU, we document and present the following information.

- Program Investments – Documents funding for each program, housing units served, and average investment per housing unit.
- Program Targets and Delivery Procedures – Identifies types of buildings targeted and the approach taken to service delivery.
- Program Design Parameters – Includes information about program marketing/intake, service provider(s), program coordination, and financial incentives.
- Energy Efficiency Measures – Furnishes detailed information about the types of energy efficiency measures, including health and safety measures, installed by each program.
- Program Performance Statistics – Documents the available information on program performance, including the first-year projected savings, cost per unit of first-year projected savings, utility cost test, and societal cost test.

These data are used to compare the programs implemented by each IOU. They also are used to show comparative investments among the IOUs by program type and to identify individual IOU programs that deliver a unique set of program services. The analysis compares the program performance statistics for each program and each IOU. However, since the estimated savings are generally not subjected to measurement and verification procedures or evaluated using billing data analysis or other procedures, we did not have confidence that those statistics furnished reliable estimates of savings.

Natural Gas IOU Low-Income Programs

The five natural gas IOUs are required to spend 0.4 percent of their three-year average residential gross operating revenues on low-income programs. Our review of the 2014 Annual Status Reports, supplemented with examination of the 2017-2019 Triennial Plans found that the natural gas IOUs have implemented an innovative set of low-income programs that meet or exceed the statutory and regulatory low-income program requirements. In addition, some of the natural gas IOUs have implemented programs in their residential and commercial segment portfolios that furnish additional services to low-income customers and buildings.

CenterPoint Energy (CPE)

In 2014, CPE spent \$2,207,285 on low-income programs that served 3,672 housing units. About 80 percent of their spending was allocated to a comprehensive single family (1 to 4 housing units) weatherization program that was delivered by WAP service providers and where the CPE resources were combined with funding from WAP and EAP. However, CPE also reported spending on four innovative programs that were targeted to other low-income market segments.

- Nonprofit Affordable Housing Project – CPE worked with Affordable Housing Organizations (e.g., Habitat for Humanity) to help them install high-efficiency equipment and building shell measures in housing units being constructed or rehabilitated by those organizations.
- Multifamily Building Project – CPE worked directly with owners of low-income buildings to furnish rebates for building-level heating and water heating equipment that would help to make those buildings more energy efficient.
- Rental Efficiency Project – CPE contracted with Energy Cents, a nonprofit organization, to work with owners of low-income renter-occupied buildings to install building-level and unit-level measures. In this program, CPE paid for 50 percent of the cost of services and the building owner paid for the other 50 percent of the cost of services.
- Heating System Tune-Ups – CPE delivered heating system tune-ups to a large number of low-income households prior to the heating season.

Each of these four programs represents a good example for other IOUs of ways to extend the set of low-income programs to better serve the entire low-income population. Based on the reported performance statistics, the Nonprofit Affordable Housing Project and the Multifamily Building Project were cost-effective from the perspective of the societal cost-effectiveness test. We recommend that CPE conduct research to verify the projected saving estimates and report to the Department and other IOUs regarding the measured program realization rates.

In addition to those innovative programs, CPE is working with Xcel to implement the Multifamily Building Efficiency Program that is delivering comprehensive services to multifamily buildings. In 2017, that project proposes to invest \$533,262 of CIP funds, about 35 percent (\$186,642) of which would be used to serve low-income buildings. The Multifamily Building Efficiency Program is a commercial segment program that was not counted toward CPE's low-income spending requirement in their 2017-2019 Triennial Plan.

Xcel Energy (Xcel)

In 2014, Xcel spent \$1,791,458 on low-income programs that served 1,923 housing units. About 80 percent of their spending was allocated to a comprehensive single family weatherization program (HESP). In the eastern metropolitan region, HESP was delivered by Energy Cents, a nonprofit organization that is not a WAP service provider; all services delivered to the home were funded by Xcel.

In the western metropolitan region and in outlying areas, HESP was delivered by WAP service providers in combination with WAP and EAP funding.

Xcel also implemented the Low-Income Home Energy Squad (LI-HES) program that was delivered by the Neighborhood Energy Connection (NEC). This was a low-cost direct install program in which a limited set of program services were delivered at no cost to households in a single visit to the home. NEC also delivers this program to Xcel customers who are not low-income for a modest fee. The LI-HES program should be considered by other IOUs, since it has high projected first year energy savings for a comparatively low cost and is projected to have a societal cost-effectiveness ratio of 1.43. In addition, the LI-HES program offers IOUs an effective way to screen low-income households for the delivery of more comprehensive program services. We recommend that Xcel conduct research to verify the project savings levels so that other IOUs can have confidence that the program model delivers the expected savings.

In addition to those innovative programs, Xcel is working with CPE to implement the Multifamily Building Efficiency Program that is delivering comprehensive services to multifamily buildings. In 2017, that project proposes to invest \$280,740, about 35 percent (\$98,259) of which would be used to serve low-income buildings. The Multifamily Building Efficiency Program is a commercial segment program that was not counted toward Xcel's low-income spending requirement in their 2017-2019 Triennial Plan.

Minnesota Energy Resources Corporation (MERC)

In 2014, MERC spent \$950,752 on two different comprehensive energy efficiency programs that together served 185 housing units. About 30 percent of the funds were spent on their Low-Income Weatherization program that was delivered by WAP service providers in collaboration with WAP- and EAP-funded projects. About 70 percent of the funds were spent on the 4U2 program.

The 4U2s program was designed to serve households that are not served by the EAP and WAP programs; it serves moderate-income customers with incomes up to 300 percent of the poverty guidelines and asks the customer to make a modest contribution toward the delivery of program services. MERC reports that over 50 percent of the customers that participate have incomes at or below the WAP and EAP guidelines, but are customers who have not previously participated in those programs.

The 4U2 program is unique among the IOU programs in the population that it serves. The service provider reports that it is a little more expensive to recruit customers to participate in the program, since these are households that do not appear on lists of customers who are receiving public assistance. They sometimes get referrals of customers who are over-income from WAP service delivery agencies. But, the primary recruitment method is to conduct outreach to MERC's customers.

Great Plains Natural Gas (GPNG)

In 2014, GPNG spent \$69,905 to deliver weatherization services, furnace replacements, and heating systems tune-ups to 28 housing units. GPNG worked with four WAP service providers that deliver

services in their service territory. They reported that the set of low-income programs was cost-effective; the societal cost-effectiveness ratio was 1.37. One innovation from GPNG was that they set a limit on spending for each type of service. It is possible that setting such a limit resulted in a higher level of cost-effectiveness compared to other programs.

Greater Minnesota Gas (GMG)

In 2014, GMG spent \$16,622 to deliver comprehensive services to nine housing units. The program implementer, NEC, delivered the Home Energy Services Program to all customers. When they identified a customer who qualified as low-income, GMG paid for the full cost of service delivery. In addition, GMG and NEC alerted WAP service providers that GMG would pay for the cost of delivering some services to GMG customers served by the WAP agency. Only one WAP agency identified a GMG customer in 2014.

Summary of Natural Gas IOU Low-Income Programs

Table 1 furnishes a summary of the natural gas IOU program spending for 2014. Overall, the natural gas IOUs spent over \$5 million to serve almost 6,000 low-income customers. The average spending per customer was \$866.

Table 1. 2014 Natural Gas LI CIP Program Summary

Utility	Building Type(s)	Program Type(s)	Program Spending	Units	Spending per Unit
CPE	Mixed	Mixed	\$2,207,285	3,672	\$601
Xcel Energy	Single Family	Mixed	\$1,791,458	1,923	\$932
MERC	Mixed	Comprehensive	\$950,752	185	\$5,139
GPNG	Single Family	Mixed	\$69,905	28	\$2,497
GMG	Single Family	Comprehensive	\$16,622	9	\$1,847
All Programs	Mixed	Mixed	\$5,036,022	5,817	\$866

Table 2 furnishes a summary of the comprehensive single-family programs delivered by the natural gas IOUs in 2014, including the program spending, units served, spending per unit, and savings per unit. Many of the programs are similar in their level of spending and projected performance. The MERC 4U2 program spends somewhat more per unit than the other programs because it delivers services without co-funding. The CPE Rental Efficiency Program in effect invests twice the listed amount in each home since the building owner pays for 50 percent of the cost of services and only the IOU spending is listed in the table. [Note: In 2014, the Rental Efficiency Program was in its first year. The 2015 statistics are included to demonstrate how the program operated after its initial start-up.]

Table 2. Comprehensive Single Family Natural Gas LI CIP Programs

Utility Program	Program Spending	Units	Spending per Unit	First-Year Savings (Dths)	Savings Per Unit
CPE Weatherization	\$1,779,574	511	\$3,482	9,826 ^a	19.23
CPE Rental Efficiency	\$65,996	8	\$8,250	110 ^a	13.75
2015 CPE Rental Efficiency	\$245,043	75	\$3,267	1,619 ^a	21.59
Xcel HESP	\$1,426,747	457	\$3,122	7,263	15.89
MERC Low-Income Weatherization	\$288,493	86	\$3,355	2,733	31.78
MERC 4U2	\$662,259	99	\$6,689	5,406	54.61
GPNG CAP Weatherization	\$41,447	19	\$2,181	282	14.84
GMG Home Energy Services	\$16,662	9	\$1,851	125 ^a	13.44
ALL Comprehensive Single Family ^b	\$4,281,178	1,189	\$3,601	25,745	21.65

a. Reported by CPE/GMG in MCF. Multiplied by 1.032 to convert to Dths.

b. Excludes 2015 CPE Rental Efficiency information.

The reported energy savings per unit are listed in the table. However, in-depth review of the energy savings projections finds that each program uses a different method for calculating savings and that the program savings generally have not been subjected to rigorous measurement and verification procedures.

Table 3 furnishes a summary of the other programs delivered by the natural gas IOUs in 2014, including the program spending, units served, spending per unit, and savings per unit. Many of the programs are similar in their level of spending and projected performance. These programs vary quite a bit in terms of the overall spending, spending per unit, and savings per unit. Each demonstrates an innovative approach to service in a unique low-income customer segment that should be examined by the other natural gas IOUs as an opportunity to extend the reach of their existing low-income program offerings.

Table 3. Other Natural Gas LI CIP Programs

Utility Program	Program Spending	Units	Spending per Unit	First-Year Savings (Dths)	Savings Per Unit
<i>Single Family Direct Install</i>					
CPE Heating System Tune-Ups	\$79,283	751	\$105	1,395 ^a	1.86
Xcel Home Energy Squad	\$364,713	1,466	\$249	12,413	8.47

Utility Program	Program Spending	Units	Spending per Unit	First-Year Savings (Dths)	Savings Per Unit
GPNG Furnace Replacement	\$28,350	8	\$3,544	279	34.88
GPNG Furnace Tune-Up	\$108	1	\$108	NR	NR
Single Family Measure Rebates					
CPE Non-Profit Affordable Housing	\$163,593	75	\$2,181	1,900 ^a	25.33
Multifamily Measure Rebates					
CPE Multifamily Building	\$118,839	2,327	\$51	9,458 ^a	4.06
All Other Programs					
ALL Other Programs	\$754,886	4,628	\$163	25,445	5.50

a. Reported by CPE in MCF. Multiplied by 1.032 to convert to Dths. / NR = Not Reported

Electric IOU Low-Income Programs

The three electric IOUs are required to spend 0.2 percent of their three-year average residential gross operating revenues on low-income programs. Our review of the 2014 Annual Status Reports, supplemented with examination of the 2017-2019 Triennial Plans found that the electric IOUs have implemented an innovative set of low-income programs that meet or exceed the statutory and regulatory low-income program requirements. In addition, Xcel has implemented a program in their commercial segment portfolios that furnishes additional services to low-income customers and buildings.

Xcel Energy (Xcel)

In 2014, Xcel spent \$2,222,628 on low-income programs that served 5,766 housing units. About 50 percent of their spending was allocated to a comprehensive single family weatherization program (HESP). In the eastern metropolitan region, HESP was delivered by Energy Cents, a nonprofit organization that is not a WAP service provider; all services delivered to the home were funded by Xcel. In the western metropolitan region and in outlying areas, HESP was delivered by WAP service providers in combination with WAP and EAP funding. Xcel also delivers the Multifamily Energy Savings Program (MESP) that delivers in-unit measures to low-income buildings.

Xcel also implemented the Low-Income Home Energy Squad (LI-HES) program that was delivered by the Neighborhood Energy Connection (NEC). The LI-HES is a companion to the natural gas LI-HES program. In the eastern metropolitan area, the electric and gas LI-HES programs are delivered in combination by NEC to Xcel customers. In the western metropolitan region, the program is usually limited to delivery of electric services. NEC also delivers a residential segment Home Energy Squad program for CPE. It is

possible that there is some coordination between the electric and gas program service delivery in that region. The LI-HES program should be considered by other IOUs, since it has high projected first year energy savings for a comparatively low cost and is projected to have a societal cost-effectiveness ratio of 2.30. In addition, the LI-HES program offers IOUs an effective way to screen low-income households for the delivery of more comprehensive program services. We recommend that Xcel conduct research to verify the project savings levels so that other IOUs can have confidence that the program model delivers the expected savings.

In addition to those innovative programs, Xcel is working with CPE to implement the Multifamily Building Efficiency Program that is delivering comprehensive services to multifamily buildings. In 2017, that project proposes to invest \$656,606, about 35 percent (\$229,812) of which would be used to serve low-income buildings. The Multifamily Building Efficiency Program is a commercial segment program that was not counted toward Xcel's low-income spending requirement in their 2017-2019 Triennial Plan.

Minnesota Power (MNP)

In 2014, Xcel spent \$565,405 on low-income programs that delivered 13,008 measures to low-income households. The primary service delivery approach used by the Energy Partners program was to work with seven WAP service delivery agencies. Those contractors conducted testing and assessment of lights, appliances, and other electric equipment as part of their WAP audit. They installed measures that met the program's installation protocols. It is difficult to assess the number of customers served by the program because MNP does not include that in either their Triennial Plan or their Annual Status Report. One solution to that problem might be for MNP to have the contractor record an "audit" event for each housing unit in which one or measures was installed.

Minnesota Power also reports that they deliver energy saving kits to low-income households as part of community events. Those kits are distributed to any household attending a community event. It is unclear whether MNP's estimate of the number distributed to low-income households is based on an estimate of the share of the population that is low-income or is based on distribution at events that target low-income households.

Otter Tail Power (OTP)

In 2014, Otter Tail Power spent \$142,588 on their House Therapy program that delivered services to 100 low-income households. The primary service delivery approach used by the House Therapy program was to work with WAP service delivery agencies. Those contractors conducted testing and assessment of lights, appliances, and other electric equipment as part of their WAP audit. They installed measures that met the program's installation protocols.

Summary of Electric IOU Low-Income Programs

Table 4 furnishes a summary of the electric IOU program spending for 2014. Overall, the electric IOUs spend almost \$3 million to serve over 6,000 low-income customers. We were unable to compute the

average spending per customer because Minnesota Power does not report on the number of housing units served by their program.

Table 4. 2014 Electric LI CIP Program Summary

Utility	Building Type(s)	Program Type(s)	Program Spending	Units	Spending per Unit
Xcel Energy	Mixed	Mixed	\$2,222,627	5,766	\$385
Minnesota Power	Mixed	Comprehensive	\$565,405	NR	NR
Otter Tail Power	Single Family	Comprehensive	\$142,588	100	\$1,426
All Programs	Mixed	Mixed	\$2,930,620	NA	NA

NR = Not Reported / NA = Not available

Table 5 shows that the electric IOUs invested about \$1.8 million to serve over 2,000 low-income customers in single family homes (1-4 units) with comprehensive energy services. That represented a little over 60 percent of total electric IOU spending. The average spending per home was about \$574 and the average first-year savings per home was estimated to be about 511 kWh (excluding the Minnesota Power information).

Table 5 Comprehensive Electric LI CIP Programs

Utility	Program Spending	Units	Spending per Unit	First-Year Savings (kWh)	Savings Per Unit
Xcel HESP	\$1,120,679	2,098	\$534	918,234	438
MNP Energy Partners	\$565,405	13,008 ^a	\$43	1,555,355	120 ^a
Otter Tail Power	\$142,588	100	\$1,426	204,930	2,049
All Programs	\$1,828,672	2,198	\$574 ^a	2,678,519	511 ^a

a. Excludes Minnesota Power which reported measures rather than units

Table 6 shows that the Xcel invested about \$1.1 million to serve 3,668 low-income housing units with other types of energy services. That was about 50 percent of Xcel's electric program spending and represents about 40 percent of all electric IOU spending. These programs differed from the comprehensive energy services by delivering a more limited set of program measures and treating different kinds of buildings. Each of these represents an innovative program design that might be replicated by the other electric IOUs.

Table 6. – Specialty Electric LI CIP Programs

Utility	Program Spending	Units	Spending per Unit	First-Year Savings (kWh)	Savings Per Unit
Single Family Direct Install					
Xcel LI-HES	\$295,201	1,430	\$206	1,008,187	705
Multifamily Direct Install					
Xcel MESP	\$806,748	2,238	\$360	1,026,922	460
All Other Programs					
All Other Programs	\$1,101,949	3,668	\$302	2,035,109	555

Program Assessment Framework

The purpose of this study is to conduct a comprehensive assessment of the CIP program services delivered to low-income households by Minnesota’s IOUs. We have developed an assessment procedure for presentation of our findings that examines the performance of the IOU low-income programs at three levels.

- Explicit Program Requirements and Opportunities – Did the IOUs fulfill the regulatory requirements established by the Department? Did the IOUs take advantage of the opportunities made available in Department Guidance?
 - Spending Requirement – Did the IOUs spend the required amount on low-income programs?
 - Reporting Requirement – Did the IOUs file all the required Plans and Reports that the Department needs to assess program compliance?
 - Department Guidance – Did IOUs take advantage of Department Guidance on multifamily buildings and on claiming energy savings for program services delivered to electric customers who use delivered fuels as their primary heating fuel and/or water heating fuel?
- Implicit Program Objectives – Did the set of IOU low-income programs address the broader public policy objectives that are included in the statutory language and the regulatory decisions issued by the Department?
 - Low-Income Renters – Are the programs addressing the needs of low-income renters?
 - WAP Protocols – Where appropriate, do the programs make use of the well-developed WAP protocols for conducting health and safety assessments, selecting and installing health and safety and energy efficiency measures, and establishing procedures for ensuring quality control?

- **Low-Income Program Best Practices** – Do the IOU low-income programs follow best practices that have been identified through the national evaluation of the WAP program and in state-level evaluations of WAP programs and ratepayer-funded low-income programs?
 - **Collaboration with WAP and EAP** – Does the Department and do the IOUs ensure that there is effective communication about ways that the publicly funded and ratepayer-funded programs can jointly serve the entire low-income market in ways that are supportive and not duplicative?
 - **Measurement and Evaluation Framework** – Do the IOUs have an effective system for assessing the performance of each program so that they can identify program improvement opportunities and make appropriate investment decisions?
 - **Targeting** – Do the IOUs target program services to those housing units that are likely to have the greatest program impacts, either in terms of energy savings or societal benefits?

We examined each IOUs low-income program portfolio and the overall performance of the IOU programs with respect to these specific assessment criteria.

Assessment of IOU Low-Income Programs

In this study, we assessed the extent to which the low-income programs implemented by the natural gas and electric IOUs fulfilled the explicit program requirements, addressed implicit program objectives, and adopted low-income program best practices.

Explicit Program Requirements

The study found that the natural gas and electric IOUs met or exceeded the most important explicit program requirements established by the Department.

- **Low-Income Spending Requirement**
 - **Natural Gas IOUs** – On average, the natural gas IOUs exceeded the low-income spending requirement by 33 percent in 2014.
 - **Electric IOUs** – On average, the electric IOUs exceeded the low-income spending requirement by 33 percent in 2014.
- **Reporting Requirements** – The natural gas and electric IOUs have filed all the required reports and furnished comprehensive information on their programs. However, in the 2014 Annual Status Reports, only CPE and MERC consistently furnished information on the number of renters served by their low-income programs and on the number of low-income customers and renters served by their residential and commercial segment programs. That information gap is important in terms of assessing the performance of IOU programs. In the 2017-2019 Triennial Plan review, the Department requested that IOUs furnish that information.

- Department Guidance
 - Multifamily Guidance – Many of the natural gas and electric IOUs made effective use of the Department’s 2012 Guidance related to multifamily buildings. Programs that used that guidance include the CPE Multifamily Building Project, the CPE Rental Efficiency Project, the Xcel Multifamily Energy Savings Program, and the MERC Multifamily Direct Install Program. In addition, CPE and Xcel are implementing a commercial segment multifamily building program that makes effective of that guidance.
 - Delivered Fuel Guidance – Among the electric IOUs, only Minnesota Power indicated that it planned to use the delivered fuel guidance. The electric IOUs indicated that they are aware of the guidance, but that they met their low-income spending requirements without making use of that Department guidance.

The IOUs and the Department are working effectively to ensure that the explicit program requirements are met.

Implicit Program Objectives

The study found that the natural gas IOUs addressed some of the implicit program objectives with their low-income programs.

- Low-Income Renters – About 57 percent of low-income households are renters. But, only about 25 percent of households in single family buildings are renters, while over 90 percent of households in multifamily buildings are renter.
 - Natural Gas Programs - Since most of natural gas IOU low-income spending is on programs that serve single family homes, a relatively small share is allocated to rental units. CPE has some low-income programs that explicitly target renters – the Multifamily Building Project and the Rental Efficiency Project. In addition, CPE and Xcel have implemented the Multifamily Building Efficiency program in their commercial segment portfolio that has made a commitment to serve low-income buildings. When the low-income segment program spending and the Multifamily Building Efficiency program spending are added together, we estimate that CPE and Xcel plan to spend about 20 to 25 percent of their low-income program spending on low-income renters in the 2017 program year.
 - Electric IOU Programs – Xcel has a diverse set of low-income programs that includes the Multifamily Energy Savings Program. In addition, the Multifamily Building Efficiency program in the commercial segment is planning to make a major investment in electric energy efficiency measures for low-income multifamily buildings. When the low-income segment program spending and the Multifamily Building Efficiency program spending are added together, we estimate that Xcel plans spend as much as 60 percent of their low-income program spending on low-income renters.
- Adopting and Adapting WAP Protocols – The WAP program has well-developed protocols for health and safety assessment, measurement selection and installation procedures, and quality

control. Many of those protocols would appropriately be applied to the comprehensive single family home programs implemented by IOUs. However, it also is true that some of the WAP protocols are not appropriate for ratepayer-funded programs.

- Those IOU programs that contract with WAP service providers are implicitly adopting WAP protocols. However, the IOU program managers do not verify that they were being followed correctly.
- Those IOU programs that do not contract with WAP service providers report that they expect their contractors to follow best practices. However, it does not appear that they explicitly define those best practices or verify that the contractors are following them.
- WAP protocols are not as well developed for other types of programs. The IOUs have expectations that the contractors who implement those programs will develop and apply effective procedures. However, it does not appear that they explicitly define such procedures or verify that they are implemented.

The IOUs contract with both WAP service providers and well-respected nonprofit and for-profit service delivery contractors to deliver their low-income programs. However, they do not appear to proactively establish health and safety protocols or quality control standards that those contractors must follow, nor do they appear to have procedures in place that verify that the contractors are following certain procedures.

Low-Income Program Best Practices

The study found that the IOUs have adopted some of the best practices that are implemented in other jurisdictions. However, there are important ways in which the Department and the IOUs are not taking advantage of practices that could improve the efficiency and effectiveness of their low-income programs.

Some best practices that the Department and IOUs have implemented include:

- Identification and Verification of Low-Income – The Department has well-defined procedures for specifying which households qualify as low-income and for collecting and verifying the information needed to document a household’s status. Many of the IOUs make use of those definitions and procedures.
- eHeat Database – The Department’s EAP unit has developed a database that has extensive demographic, housing unit, and natural gas and electric energy consumption data for all households that participate in EAP. That database is an invaluable resource for identifying and targeting households for the IOU low-income programs.
- WAP Service Providers – Many of the IOU programs work with WAP service providers to deliver services to low-income households. The existing WAP infrastructure can increase the efficiency and effectiveness of IOU program design and implementation.

In addition, the IOUs have worked to identify other approaches to the delivery of energy efficiency services to low-income market segments that are not well-served by the WAP and EAP programs.

Examples include:

- CPE Non-Profit Affordable Housing Program – Serves a market segment that is rarely served by state WAP programs.
- CPE Rental Efficiency Program – Differs from WAP in that the program approaches building owners directly, rather than working with a renter household and then attempting to engage the building owner.
- CPE/Xcel Multifamily Building Efficiency Program – Works directly with building owners to deliver a comprehensive set of electric and gas services to low-income multifamily buildings.
- MERC 4U2 Program – Over 50 percent of the customers served are low-income households who have not previously participated in low-income programs.

However, the Department and the IOUs have failed to implement certain best practices that should improve the performance of the programs.

- Communications Strategy – The Department does not have an effective strategy for communicating with IOUs and IOU program service providers. The Department’s CIP unit does not furnish consistent information to the WAP and EAP service providers about CIP low-income program policies and procedures. The Department’s WAP unit does not furnish consistent information to the IOUs about how WAP policies might affect their program implementation. The Department’s EAP unit does not communicate to IOUs about how the eHeat system can be used in the context of program outreach and marketing.
- Program Collaboration – There are missed opportunities for program collaboration.
 - Heating Equipment Programs – The EAP ERR program, the WAP program, and IOU low-income programs all replace heating equipment for households with nonworking systems, with the ERR program spending far more than either of the other two programs. However, in-depth interviews found that some IOUs were not even aware of the EAP ERR program. It seems appropriate for the EAP and WAP units to collaborate with the IOUs on developing a more effective way to serve low-income households that need operable heating equipment.
 - Other Opportunities – Other examples of how collaboration could be helpful include: discussion of how to address service territories where two or more programs overlap and potentially duplicate efforts, development of standard health and safety protocols, and determining whether there is a potential role for EAP or WAP in some of the innovative programs developed by the IOUs.
- Measurement and Evaluation Strategy – As required by the Department reporting requirements, the IOUs engage in intensive procedures to develop engineering estimates of the expected savings from their investment in their low-income programs. The IOUs document their procedures in their Triennial Plan and in their Annual Status Reports. However, the Department

does not specify any other measurement and verification procedures as do many other jurisdictions. The Department also does not specify any other program evaluations that would identify ways to improve the performance of the programs. Among the IOUs, only Xcel has a systematic M&V strategy and none of the IOUs has engaged in systematic evaluation of their low-income programs.

- Targeting Procedures
 - Targeting High-Usage Customers – The IOUs can take advantage of the eHeat system to target the highest energy users and improve program performance. Minnesota Power reported that they target high users. In addition, since many of the WAP service delivery agencies target high users, those IOUs that collaborate with WAP service providers may be implicitly targeting program funds in that way. However, there is not a consistent approach that is used by the IOUs to achieve the highest savings by targeting the highest users.
 - Targeting Non-energy Benefits - There is no documented effort on the part of any IOU program to identify and target households that would attain non-energy benefits from program. Since some of the Xcel programs use their affordable payment programs to identify program-eligible households, it is likely that many of those households would receive financial non-energy benefits from participation. However, additional opportunities do not appear to be pursued by the IOUs.

Overall, the analysis finds that the Department is not specifying best practices for the IOUs. Some of the IOUs have adopted best practices. But, there are many opportunities for the Department to add best practices to the program requirements and for the IOUs to adopt such practices.

Recommendations

Our assessment finds that the Department and the IOUs are effective in ensuring that the IOU low-income programs meet the explicit low-income program requirements. It further finds that the IOUs have made important progress on implicit program objectives, including delivering program services to low-income renters and in terms of making use of WAP protocols. But, it finds that there are important low-income program best practices that are not followed by the Department or by the IOUs. If the low-income programs are expected to become more effective and efficient, the Department and the IOUs will need to work to consider and implement those best practices through a collaborative effort.

Explicit Program Requirements

Our primary recommendation with respect to the explicit program requirements is that the Department should work with the IOUs to develop more effective ways of reporting on the number of low-income customers and the number of low-income renters that participate in CIP programs. The rationale for allocating a certain share of CIP program spending on low-income households is that low-income households pay for CIP program services in their rates, but are much less likely to participate and receive

benefits from the residential and commercial segment programs. The information provided by CPE in their Triennial Plans and Annual Status Reports furnishes excellent information with which policymakers can examine that rationale for program spending and can consider how to adapt that policy in the future.

We consider this to be a low priority / low effort recommendation. It is important, but is not critical to current program operations. Since CPE has a well-developed procedure for accomplishing this reporting objective, we consider that this would not be expensive or time-consuming to implement.

Implicit Program Objectives

The IOUs have made good progress toward meeting the implicit program objectives without much guidance from the Department. We recommend that the Department establish policies that clarify the importance of these implicit program objectives and set guidelines that give the IOUs better information on what is required. Specific recommendations include:

- **Counting “Low-Income” Spending** – There has been some ambiguity about what spending should be counted as “low-income” spending. It includes spending on programs in the IOU’s low-income segment. But, should it also include spending on low-income customers and buildings that participate in residential and commercial segment programs. Our recommendation is that “low-income” spending should include any CIP spending in which the customer or building receives special consideration because they are “low-income.” Spending related to a low-income customer who receives a refrigerator rebate that is available to all residential customers should not be included as “low-income” spending. However, if a low-income building receives a rebate that is 80 percent of program costs while a non-low-income building receives a rebate that is 40 percent of programs costs, the cost of that program should be included in the low-income spending calculations.

We consider this to be a moderate priority / moderate effort recommendation. It is moderate priority because it is an outstanding ambiguity that should be resolved. It is moderate effort because, while it is not conceptually challenging, it involves an important policy on which there should be input from all parties.

- **Reporting Low-Income Spending Percentage for Low-Income Renters** – This analysis has documented that low-income renters represent about 57 percent of low-income households. That percentage is likely to vary by low-income service territory. The Department should develop estimates of the share of households in each IOU’s service territory that are renters and should require IOUs to report what percentage of “low-income” spending is allocated to renters in their Annual Status Report. The Department and the IOUs should review those statistics and consider whether additional initiatives to serve renters would be appropriate.

We consider this to be a high priority / low effort recommendation. It is high priority because the statute clearly identifies low-income renters as an important population and there was considerable discussion

of this issue during the 2017-2019 Triennial Plan reviews. It is low effort once the prior issue has been resolved since we perceive that all the data are readily available.

- Program Replication – This analysis found that the IOUs have developed innovative programs that support the implicit program objective of delivering program services to all low-income market segments. IOUs that have not yet implemented those program models should consider whether they are appropriate for their service territory. Specific recommendations include:
 - CPE Non-Profit Affordable Housing and CPE Rental Efficiency – These programs illustrate a different way of serving low-income housing.
 - MERC 4U2 – This program demonstrates a different way of serving low-income households, particularly those that have not previously participated in low-income programs.
 - Xcel LI-HES – This program highlights a different and potentially more efficient way of energy efficiency measures to low-income households.
 - CPE / GPNG Heating System Tune-Up – These programs deliver some relatively low-cost energy savings and are likely to identify some households that are at risk from a malfunctioning furnace.

Before other IOUs replicate these programs, it would be important for the programs to be subjected to enhanced evaluation, measurement, and verification procedures to ensure that the projected savings reported by the sponsoring IOUs are being realized in the practical application of the program. The projected energy savings from the MERC 4U2 program and the Xcel LI-HES program, in particular, are outliers compared to those for similar programs implemented in other service territories that have been subjected to rigorous evaluation, measurement, and verification.

We consider this to be a moderate priority / moderate effort recommendation. It is moderate priority because adoption of these new program models would likely represent an incremental improvement in an IOU's low-income program offerings. It is moderate effort because an IOU would need to get documentation on the program design and consider how to add it to their 2020-2022 Triennial Plan. They also might want to pilot test the concept to see if it is workable in their service territory.

- WAP Protocols – This analysis finds that the Department's WAP program office has developed good-quality protocols for serving low-income households with comprehensive single family programs and that the non-WAP IOU service providers report that they have adopted good-quality protocols. However, it is appropriate for the Department, IOUs, and service providers to work together to ensure that common standards are understood and verified for all service providers. [Note: Similar protocols should be developed for other types of programs (e.g., large multifamily building programs). However, it might be appropriate for the IOUs to take the lead on that initiative, since they are working more aggressively in that market segment than is the Department.]

We consider this to be a moderate priority / high effort recommendation. It is only moderate priority because the evidence suggests that all service providers are working to deliver good-quality services. It is

high effort because the protocols are complex and even the experts do not always agree on appropriate standards.

Low-Income Program Best Practices

Our assessment found that there are many opportunities for the Department to work with the IOUs to consider ways to operationalize low-income program best practices. Specific recommendations include:

- **Communications** – Discussions with the Department units have identified a potential strategy for improving communications. It was recommended that each of the Department’s low-income program units—CIP, WAP, and EAP—should identify a communications liaison who would have responsibility for identifying common information that should be distributed to all parties that are involved in CIP low-income programs, including IOUs, WAP service providers, and EAP service providers. As those liaisons identify issues, it would be the job of the CIP unit to communicate with IOUs, the WAP unit to communicate with WAP service providers, and the EAP unit to communicate with EAP service providers. One example of communication might be the WAP unit’s most recent analysis of the cost of health and safety measures installed by WAP service providers. That would be useful information to disseminate to all parties.

We consider this to be a high priority / moderate effort recommendation. It is high priority because there is important information that is not being communicated. It is moderate effort because, while it does not have to be particularly time-consuming, the Department staff are already fully booked with existing responsibilities. Finding the time to communicate consistently would be a challenge.

- **Program Collaboration** – This study has identified a number of different ways that the Department’s programs and the IOU program could increase collaboration. The Department’s low-income program units and the IOUs should have an ongoing work group that identifies ways to improve collaboration. The highest priority example is improving the collaboration among the Department’s EAP unit, the Department’s WAP unit, and the IOUs in terms of coordinating equipment replacement services. There are three different ways that a low-income customer can get new heating equipment to replace inoperable or unsafe equipment – the ERR program, the WAP program, and the IOU programs. The Department’s EAP and WAP units have recently worked through procedures for coordinating the type of units that will be installed and how the programs will interact. That discussion should be extended to include the natural gas and electric IOU program managers who report that they are struggling with that issue.

We consider this to be the highest priority issue for the Department and the IOUs. It is a high priority / high effort initiative. It is high priority because a failure to effectively coordinate services can result in program inefficiencies in an area where it is critical the very dollar available is spent to maximum effect. It is high effort because the program procedures are complex and must be carefully mapped to identify the optimal approach to coordination. We consider the initiative that was undertaken to establish the Department Guidance on multifamily buildings to be an excellent example of how to work towards this collaboration and, at the same time, demonstrate the potential benefits of undertaking such an initiative.

- **Evaluation, Measurement, and Verification (EM&V)** – The Department and the IOUs need reliable information on low-income program performance to make decisions on how best to allocate program resources to low-income program initiatives. The Department and the IOUs have taken the important first step toward the development of that information. The Department has worked to develop a Technical Reference Manual that serves both low-income and non-low-income programs. The Department also has allowed IOUs to make use of other savings projection procedures that may be appropriate for the special circumstances associated with low-income programs. However, the Department has failed to take the important next steps of establishing standard measurement and verification protocols and specifying the content of and schedule for regular program evaluations. As a result, the IOUs are developing low-income program portfolios with no reliable information on the actual performance of the individual programs. Moreover, the Department itself has not taken responsibility for conducting similar research and evaluation of its own programs. While neighboring states such as Wisconsin, Illinois, and Iowa regularly conduct evaluations of their WAP programs, the Department has not undertaken such an initiative for Minnesota, despite having the eHeat system developed by the EAP unit that gives Minnesota a considerable advantage over those other states in terms of being able to conduct such an evaluation. We recommend that the Department take a leadership role in conducting an evaluation of its own WAP program, and that it work with the IOUs to specify appropriate measurement and verification procedures and evaluation guidelines to ensure that low-income households in Minnesota are being served with the best quality low-income programs, and that resources are directed to those programs that deliver the greatest benefits.

Since about one-half of IOU LI CIP spending is spent on WAP-funded jobs, we recommend that the IOUs participate in designing and funding such an evaluation so that they can get the detailed information that they need to understand the relative savings of LI CIP measures and their interaction with the WAP-funded measures.

We consider this to be a high priority / high effort recommendation. It is high priority because it is the foundation on which good policy is developed. It is high effort because EM&V are complex issues. The Department staff and many of the IOUs have relatively little experience with the standards and procedures. And, each type of program implemented by the IOUs would need different types of EM&V procedures.

- **Targeting** – The Department and the IOUs should work to develop appropriate targeting procedures. The Department and IOUs can make use of targeting findings from evaluations in other jurisdictions. For example, Minnesota Power is targeting households with high energy usage. However, more intensive targeting analysis cannot be implemented until there are better guidelines on program objectives and until better research has been conducted on the Minnesota IOU programs that demonstrates what kind of targeting would be most beneficial.

In the short run, targeting high usage households and buildings for program services is a high priority / low effort initiative. It is high priority because other evaluations have clearly shown that targeting high usage households and high usage buildings results in higher savings and more cost-effective programs. It

is low effort because the eHeat system and utility benchmarking of multifamily buildings furnishes the needed information. In the long run, it is a moderate priority / moderate effort initiative. It is moderate priority because it will be important to take advantage of the findings from Minnesota low-income program EM&V efforts. It will be moderate effort because it will involve review and assessment of EM&V reports.

The Department and the IOUs have worked hard to develop an innovative set of low-income programs that appear to be delivering good-quality services to low-income households in Minnesota. The Department and the IOUs should move forward to implement the recommended initiatives to ensure that the programs are moving in the direction of maximizing the impact of the programs per dollar spent.

1.0 Introduction

The purpose of this study is to conduct a comprehensive assessment of the Conservation Improvement Program (CIP) services delivered to low-income households by Minnesota's investor-owned utilities (IOUs) with the goal of helping the Department of Commerce (Department) and the Investor Owned Utilities (IOUs) to identify ways to increase the efficiency and effectiveness of those programs. The assessment included:

- Development of an assessment framework that compares IOU program performance to explicit CIP statutory and regulatory requirements, implicit public policy objectives, and low-income energy efficiency program best practices.
- Documentation of the context in which CIP low-income programs are implemented by developing information on low-income households and housing units and the ways that publicly-funded low-income energy assistance and energy efficiency programs serve those households and housing units.
- Collection of information about each IOU's low-income CIP programs, characterization of the design and implementation of those programs, analysis of the program performance statistics, and identification of unique program designs or approaches that could be replicated by other IOUs.
- Assessment of whether the overall investment by IOUs and their ratepayers in low-income programs are meeting explicit regulatory requirements, fulfilling implicit public policy objectives, and taking advantage of low-income program best practices.
- Identification of opportunities for the Department and the IOUs to undertake initiatives that could enhance the performance of the IOU low-income programs.

The purpose of this report is to furnish the study findings and recommendations. The report is designed to complement the information contained in the report titled *IOU CIP Low-Income Spending Requirements – Regulatory and Policy Analysis* that documents the regulatory framework for IOU low-income programs. This report is limited to analysis of IOU programs serving low-income households; there is a separate report on programs implemented by community-owned utilities (i.e., electric cooperatives and municipal utilities).

1.1 Methodology

The project team conducted the following research and analysis to complete this assessment.

- LI CIP Policies and Procedures – Information on LI CIP policies and procedures from the regulatory analysis was used to establish what IOUs are required to do and what they are allowed to do in the design and implementation of their CIP low-income programs.

- Low-Income Households – Data from the American Community Survey (ACS) were used to estimate the number of low-income households in Minnesota and to furnish information about those households.
- Federally Funded Low-Income Programs – Documentation from the Energy Assistance Program (EAP) and the Weatherization Assistance Program (WAP), along with in-depth interviews with EAP and WAP program managers were used to understand the opportunities for and limitations of LI CIP collaboration with those programs.
- IOU Program Characterization - Information from the IOU CIP Triennial Plans (2013-2105 and 2017-2019), and the Annual Status Reports (2013 and 2014) were used to document the funding allocated to each low-income program, the design and implementation of each program, and the program performance statistics. The primary focus of the study was on the 2013-2015 Plans and the 2014 Annual Status Reports. However, other Plans and Status Reports also were reviewed to examine supplemental analysis issues.
- In-Depth Interviews – The project team conducted in-depth interviews with the Department’s CIP unit staff, low-income program managers for all IOUs, and a purposive sample of low-income program service providers to develop a more comprehensive understanding of the details of and rationale for the design and implementation of the IOU low-income programs, and to obtain recommendations from those managers regarding the barriers and opportunities associated with those programs.

These research activities furnished the project team with a comprehensive understanding of the IOUs’ low-income programs and their performance metrics, and helped us to identify program design and implementation barriers and opportunities.

1.2 Organization of the Report

The report has the following sections:

- Summary – Furnishes an overview of the study findings and recommendations.
- 1.0 Introduction – Describes the study purpose and methodology, and the organization of the report.
- 2.0 Low-Income Program Context – Furnishes information on low-income households in Minnesota. Documents the approach used by EAP and WAP to serve low-income households and identifies the opportunities and barriers that it presents to LI CIP programs.
- 3.0 Analysis Framework – Outlines the analysis framework that was used to document the investments made by IOUs in their low-income programs, to characterize those programs, and to examine the projected performance of those programs.
- 4.0 Natural Gas IOU Low-Income Programs – Characterizes the natural gas IOU low-income program(s) implemented in 2014 in terms of investments, program design, and performance metrics. Identifies unique programs implemented by individual IOUs.

- 5.0 Electric IOU Low-Income Programs – Characterizes the electric IOU low-income program(s) implemented in 2014 in terms of investments, program design, and performance metrics. Identifies unique programs implemented by individual IOUs.
- 6.0 Assessment Framework – Documents the explicit requirements for IOU low-income programs, the implicit public policy objectives that can be derived from CIP statutory language and regulatory decisions, and identifies best practices for low-income programs.
- 7.0 Assessment of Natural Gas IOU Programs – Examines the performance of the natural gas low-income programs in terms of explicit program requirements and implicit policy goals. Identifies possible approaches for enhancing the performance of programs.
- 8.0 Assessment of Electric IOU Programs – Examines the performance of the electric low-income programs in terms of explicit program requirements and implicit policy goals. Identifies possible approaches for enhancing the performance of programs.
- 9.0 Program and Policy Recommendations – Identifies changes the Department and the IOUs should consider for improving the performance of IOU low-income programs.

Background documents and spreadsheets related to the research conducted by the project team are available upon request.

2.0 Low-Income Program Context

The CIP statute requires electric and natural gas IOUs to spend funds on low-income programs. The statute defines “low-income programs” as “energy conservation programs that directly serve the needs of low-income persons, including low-income renters.” The statute does not furnish a specific definition of “low-income persons.” Many of the IOUs use the state’s WAP and EAP income guidelines to determine eligibility for low-income programs.

The Department has encouraged IOUs to work with WAP service delivery agencies in the design and implementation of their low-income programs. All the IOUs except for Greater Minnesota Gas (GMG) currently contract with WAP service providers to deliver one or more of their programs. A review of plan filings and decisions also shows that, in some cases, the Commissioner has ordered an IOU to follow the state’s WAP guidelines in implementing a low-income program even when that program was not implemented by a WAP service provider.

Since many IOU programs use EAP or WAP income guidelines and have adopted WAP program protocols, it is important to have information on the EAP and WAP programs to understand the rationale for IOU program designs. In addition, it is useful to have statistics on those programs to understand more about the ways that the publicly-funded and ratepayer-funded programs can collaborate. This section of the report includes information on the following topics.

- Income-Eligible Households – Documents EAP and WAP income guidelines and furnishes estimates of the number of income-eligible households, along with statistics on housing unit types and main heating fuels for income-eligible households.
- EAP Program – Furnishes information on the program guidelines, program spending, and program participants.
- WAP Program – Furnishes information on the program guidelines, program spending, and program participants.

This report furnishes summary information on EAP and WAP program requirements. More information is available in the state EAP and WAP program manuals.

2.1 Income-Eligible Households

The EAP and WAP programs each have an income threshold for program eligibility. The EAP program’s threshold is 50 percent of state median income by household size. The WAP program’s threshold is the higher of the EAP threshold and 200 percent of the HHS poverty guidelines. For households with three or more household members the WAP threshold is higher than the EAP threshold. Table 7 shows the number and percent of Minnesota households that are income-eligible for EAP and WAP. Table 8 and Table 9 show the distribution of WAP income-eligible households by building type and ownership status.

Table 10 and Table 11 show the distribution of WAP income-eligible households by building type and main heating fuel.

Table 7 shows that about 23 percent of households are income-eligible for EAP and that about 24 percent are income-eligible for WAP.

Table 7. Number and Percent of EAP and WAP Income-Eligible Households in 2015

Program Eligibility Group	Number	Percent
EAP Income-Eligible Households	487,239	23%
WAP Income-Eligible Household	507,982	24%
TOTAL Households	2,147,260	100%

Source: 2015 American Community Survey

Table 8 shows that about 50 percent of households that are income-eligible for WAP live in single family homes, while 36 percent live in large multifamily buildings. About 85 percent of WAP income-eligible owners live in single family homes, while 61 percent of WAP income-eligible renters live in large multifamily buildings.

Table 8. Number and Percent of WAP Income-Eligible Households in 2015 by Housing Unit Type and Ownership Status

Building Type	All		Owners		Renters	
	Number	Percent	Number	Percent	Number	Percent
Manufactured Housing ^a	30,320	6%	22,089	10%	8,231	3%
Single Family Homes	255,033	50%	186,537	85%	68,496	24%
Small Multifamily (2-4 units)	40,285	8%	3,740	2%	36,496	13%
Large Multifamily (5+ units)	182,344	36%	7,888	4%	174,456	61%
All Building Types	507,982	100%	220,254	100%	287,728	100%

Source: 2015 American Community Survey

a. Includes "Other" types of housing units

Table 9 shows the statistics in a slightly different way. It shows the share of low-income households in each type of housing unit that are owners vs. renters. For both manufactured and single family homes, almost three-fourths of low-income household are owners. For both small multifamily and large multifamily homes, over 90 percent of low-income households are renters.

**Table 9. Number and Percent of WAP Income-Eligible Households in 2015
by Housing Unit Type and Ownership Status**

Building Type	All		Owners		Renters	
	Number	Percent	Number	Percent	Number	Percent
Manufactured Housing ^a	30,320	100%	22,089	73%	8,231	27%
Single Family Homes	255,033	100%	186,537	73%	68,496	27%
Small Multifamily (2-4 units)	40,285	100%	3,740	9%	36,496	91%
Large Multifamily (5+ units)	182,344	100%	7,888	4%	174,456	96%
All Building Types	507,982	100%	220,254	43%	287,728	57%

Source: 2015 American Community Survey

a. Includes "Other" types of housing units

Natural gas IOUs are expected to deliver energy services to their customers. In most cases, a household that uses natural gas will use it as their main heating fuel. Table 10 shows that 280,288 WAP income-eligible households use natural gas as their main heating fuel, about 55 percent of all WAP income eligible households.

**Table 10. Number and Percent of WAP Income-Eligible Households in 2015
by Housing Unit Type and Main Heating Fuel ^a**

Building Type	Natural Gas Main Heat		Electric Main Heat		Delivered Fuel Main Heat	
	Number	Percent	Number	Percent	Number	Percent
Manufactured Housing ^b	17,739	6%	2,613	2%	9,511	12%
Single Family Homes	155,218	55%	34,275	25%	63,148	81%
Small Multifamily (2-4 units)	25,156	9%	12,345	9%	2,158	3%
Large Multifamily (5+ units)	82,175	29%	85,683	64%	3,112	4%
All Building Types	280,288	100%	134,916	100%	77,929	100%

Source: 2015 American Community Survey

a. Excludes other fuel types

b. Includes "Other" types of housing units

Virtually all households use electricity and can be served by electric IOU programs. However, Table 11 shows that only about 27 percent of WAP income-eligible households report that electric is their main heating fuel. While natural gas IOUs can deliver a comprehensive set of natural gas energy efficiency measures to most of their customers, an electric IOU is more limited in the set of measures that its

program can deliver. About 13 percent of low-income single family homes have electric main heat and are likely to be able to receive all types of electric energy efficiency services. However, 87 percent of those housing units use either natural gas or a delivered fuel for their main heat and many of those might only be eligible for services related to space cooling, lighting, refrigeration, and appliances. In 2012, the Department issued guidance that allowed electric utilities, at their option, to deliver heating and water heating energy efficiency services to customers who use a delivered fuel or who use natural gas that is delivered by a utility that is not subject to the CIP requirements. Table 11 shows that about 25 percent of single family homes have delivered fuel main heat and could be served by electric IOU low-income programs.

**Table 11. Number and Percent of WAP Income-Eligible Households in 2015
by Housing Unit Type and Main Heating Fuel ^a**

Building Type	All		Natural Gas Main Heat		Electric Main Heat		Delivered Fuel Main Heat	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Manufactured Housing ^b	30,320	100%	17,739	58%	2,613	9%	9,511	31%
Single Family Homes	255,033	100%	155,218	61%	34,275	13%	63,148	25%
Small Multifamily	40,285	100%	25,156	62%	12,345	31%	2,158	5%
Large Multifamily	182,344	100%	82,175	45%	85,683	47%	3,112	2%
All Building Types	507,982	100%	280,288	55%	134,916	27%	77,929	15%

Source: 2015 American Community Survey

a. Excludes other fuel types

b. Includes "Other" types of housing units

Table 7 through Table 11 furnish useful information on the number and types of WAP-income eligible households that could be served by the IOU low-income programs. Most households in Minnesota that use natural gas are served by the IOUs. So, the statistics in Table 10 and Table 11 for natural gas main heat households are a reasonable approximation of the households that are eligible for the natural gas IOU programs. However, many Minnesota households have their electricity delivered by a cooperative or a municipal electric utility. So, only a subset of the WAP income-eligible households would be served by the IOUs.

Another important issue is that not all low-income households are direct customers of a utility. Some low-income households have their heat included in their rent and others have all their energy services included in their rent. For those households, it is more difficult for an IOU to identify that a household is

their customer, since it is the building owner that is their customer. As a result, even though we know that there are 280,288 WAP income-eligible households that use natural gas and that most of those households are served by the natural gas IOUs, not all of those households will be direct customers of the IOUs.

2.2 EAP Program

The EAP program is managed by the Department and is implemented by 31 local service delivery agencies. The Department develops EAP policies and procedures, and monitors the local service delivery agencies. The local agencies conduct program outreach and intake, and work with energy suppliers (including natural gas and electric utilities) to help ensure that participating households maintain energy service.

Households apply for EAP programs using the Minnesota Energy Programs application. In completing the application, they furnish documentation on the number of people in their household and on all sources of income. They also document the type of housing unit they occupy, their main and supplemental heating fuels, whether they are without energy service, and other information about their energy status. The EAP program makes use of that information to assess whether the household is income-eligible for EAP heating assistance benefits and for determining whether the household has a need for other available program services. The information supplied by clients is recorded in the Department's eHeat database. That database is used for tracking program participation and is available to the EAP and WAP service delivery agencies for outreach to clients for other program services.

In FFY 2016, Minnesota received \$124.0 million in LIHEAP funds. Table 12 shows how funding was allocated among the programs and the number of households served by each program.

The primary use of EAP funds is to pay for heating assistance for income-eligible households. Most households served by the program first apply for a heating assistance benefit. In FFY 2016, \$63.1 million (51 percent) of the LIHEAP funds were used to deliver heating assistance benefits to 132,786 households. About 27 percent of income-eligible households (132,786 out of 487,239) received EAP heating assistance. Each EAP recipient has the option of having all of their benefit paid to their main heating fuel account or, alternatively, having 70 percent paid to their heating account and 30 percent paid to their electric account.

Table 12 shows that LIHEAP funds are also used for several other purposes. Three of those programs offer opportunities for collaboration with the IOU low-income CIP programs.

- Energy Related Repair (ERR) – ERR is a crisis program that repairs or replaces nonworking or unsafe heating systems for EAP-eligible homeowners. In FFY 2016, EAP service delivery agencies spent \$6.0 million to deliver services to 4,692 households.
- Assurance 16 (A16) – These funds are used by local EAP service providers to furnish budget counseling, energy education, energy assessments, and other services that help households to reduce their needs for energy assistance.

- Weatherization – The EAP program transferred \$10.2 million to WAP. The EAP funds used for weatherization are spent using DOE WAP protocols with the exception that the funds not subject to the DOE WAP statewide average cost per dwelling unit limit.

Table 12. LIHEAP Funding and Participants by Program for FFY 2016

Program	Funding		Participants	
	Amount (in millions)	Percent	Number of Households Receiving Benefit	Percent of Households Receiving Benefit
Heating Assistance	\$63.1	51%	132,786	100% ^b
Crisis Assistance	\$20.5	17%	40,476	30%
Energy Related Repair	\$6.0	5%	4,692	4%
Weatherization	\$10.2	8%	1,073	<1%
Assurance 16	\$4.6	4%	--	--
Administration	\$12.2	10%	--	--
Carryover	\$7.4	6%	--	--
TOTAL	\$124.0	100%	132,886 ^a	100%

Sources: 2016 Performance Data From, 2016 LIHEAP Household Report

a. Unduplicated count of clients receiving any type of assistance.

b. Rounds to 100%.

There are opportunities for the IOUs to collaborate with each of these programs.

- ERR Program – Most IOU program managers consider malfunctioning heating equipment as one important barrier to delivering services to low-income households. The ERR program worked with 4,692 low-income households in FFY 2016 to resolve those issues. However, some IOU program managers indicated that they were not aware of the ERR program.
- A16 Program – The A16 program gives EAP service delivery agencies the flexibility to work with utilities to find better ways to serve low-income households. It is likely that discussions among the state EAP program office, the local service delivery agencies, and the IOUs could identify some ways in which those funds could be used to improve LI CIP program outreach and service delivery.

The other important statistic that can be derived from the EAP program data is that relatively few households who apply for energy assistance have electricity as their main heating fuel. Table 13 shows the main heating fuel for EAP clients. About two-thirds of EAP clients use natural gas for their main heat. Many of those clients are eligible for low-income programs implemented by the natural gas IOUs. About 13 percent of clients have electric main heat and would be eligible for low-income programs

implemented by electric IOUs or COUs. About 20 percent of clients have a delivered fuel main heat and could be eligible for heating energy efficiency programs if their IOU chooses to use the Department guidance on serving delivered fuel households.

Table 13. Number and Percent of EAP Recipients by Main Heating Fuel in FFY 2016

Main Heating Fuel	Number	Percent
Natural Gas	89,372	67%
Electricity	16,638	13%
Propane	17,908	13%
Fuel Oil	6,128	5%
Other	2,740	2%
TOTAL EAP Recipients	132,786	100%

Source: 2016 LIHEAP Performance Data Form

2.3 WAP Program

The WAP program is managed by the Department and is implemented by 24 local service delivery agencies.¹ The Department develops WAP policies and procedures, and monitors the local service delivery agencies. The local agencies conduct program outreach and intake, and deliver weatherization services to households. Most WAP program participants first apply for EAP and, as part of that application process, indicate that they are interested in receiving weatherization services. Households that have not received EAP can apply separately for WAP using the same application form. As discussed earlier in this section of the report, some households are income-eligible for WAP, but not for EAP.

For Program Year 2016, WAP received a program allocation from DOE of \$8.4 million, along with a \$1.6 million grant for training and technical assistance. When added to the \$10.2 million from the EAP program (EAP/WX), the WAP program had a total of \$20.2 million available to train WAP program staff and deliver services to low-income households. In Program Year 2016, the WAP program used DOE funds to deliver services to 1,052 housing units and used EAP/WX funds to deliver services to 1,073 housing units. The unduplicated count of housing units served by the two funding sources was 1,782. The Department did not report statistics on how many of the housing units served by WAP or EAP/WX funds also received LI CIP program funding.

The delivery of WAP and EAP/WX weatherization program services is outlined in the WAP State Plan and by the WAP/EAP agreement on use of EAP funds for weatherization. The Minnesota WAP Policy Manual 4.6 furnishes detailed guidance on WAP program implementation. In deciding whether and how to

¹ Twenty-one of the 24 WAP service delivery agencies also are EAP service delivery agencies.

collaborate with WAP service delivery agencies, it is important for IOU low-income program managers to have an understanding of the opportunities and barriers associated with WAP program guidelines.

2.3.1 WAP – Eligible Housing Units and Eligible Program Measures

It is important to understand that WAP service providers are not allowed to use DOE funds to weatherize certain homes, and that they are allowed to defer service delivery for certain situations. Some examples include:

- **Condition of the Housing Unit** – The housing unit has structural or equipment issues that cannot be addressed with the WAP funding available.
- **Status of the Housing Unit** – The housing unit is scheduled for demolition, is in the process of being sold, or is in the process of being remodeled.
- **Client-Related Issues** – The client is uncooperative, refuses to have certain cost-effective measures installed, or is unable to ensure the safety of weatherization staff.

It is important for IOU program managers to review the WAP guidelines and consider which should be adopted by their programs. For example, WAP program funds cannot be used to weatherize a home that was weatherized after 1994. However, since equipment efficiency and weatherization procedures have changed significantly since 1994, the IOU program might set a different standard for which homes can be considered for weatherization. However, the IOU programs might want to adopt WAP practices such as excluding homes that are about to be sold from their low-income programs.

Another important part of WAP guidelines are those related to housing unit types, assessment protocols, and building owner contributions.

- **Housing Unit Types** – The WAP program defines three different types of housing units – mobile homes, single family homes, and multifamily homes. Unlike the Census definitions, the WAP program defines single family homes as those in buildings with one to four units and multifamily homes as those in buildings with five or more units.
- **Assessment Protocols** – The WAP program requires states to have approved assessment protocols for each type of housing unit. Using the approved assessment tool, the service delivery agency identifies which measures are cost-effective (i.e., have a savings-to-investment ratio of 1.0 or greater) and which are not. The program requires that service delivery agencies install all measures that are determined to be cost-effective and only those measures. [Note: Health and safety measures are not included in this assessment.]
- **Building Owner Contributions** – For single family homes, local service delivery agencies are required to work with the building owner to assess whether owner contributions to the cost of service delivery are appropriate. For multifamily buildings, building owner contribution are required. There are special rules about owner contributions to “buy-down” the cost of measures that are not determined to be cost-effective.

DOE has issued guidance about how state WAP programs can change these guidelines when using leveraged funds (e.g., building owner funds and utility program funds). The Minnesota WAP office has issued guidance with respect to building owner “buy downs” for measures installed in multifamily buildings, but not with respect to utility program “buy downs” for those buildings. In addition, DOE regulations allow WAP service delivery agencies to install any measure where the full cost of the measure is paid for by a leverage source of funding (e.g., building owners, EAPWX funds, and utility program funds). Since the value of an energy efficiency measure to the IOU may be different from the value calculated by the WAP program, it would make sense for the Department’s WAP unit and the IOU program managers to discuss the circumstances in which it would make sense for LI CIP funds to be used to install measures that are not eligible for installation with WAP fund.

2.3.2 WAP – Quality Control and Health and Safety Guidelines

These are two other parts of the WAP program guidance that should be considered by the IOU programs; quality control procedures and health and safety guidance. These procedures have been developed to increase the quality of the work done and to ensure that homes treated by WAP are healthy and safe for clients.

The WAP quality control procedures include the following components:

- **Pre-weatherization Audit** – Each home must have a comprehensive energy audit by a certified auditor prior to treatment. The audit identifies the cost-effective energy conservation measures, general (incidental) repair measures, and required health and safety measures.
- **Standard Work Specifications (SWS)** – All work completed in the home must be completed according to the SWS by certified staff with appropriate certification for each task. Certain work must be completed by licensed professionals such as an electrician.
- **Permits** – Service delivery agencies are responsible for obtaining all permits required by local municipal agencies.
- **Inspections** – The service delivery agency is required to conduct an inspection of all completed units. In most cases, the final inspection is conducted by a Quality Control Inspector who was not involved with the audit or weatherization of the home.

In addition to the quality control work conducted by the service delivery agency, the Department’s WAP unit conducts training for service delivery agencies, and conducts desk audits and on-site monitoring of the work of each service delivery agency.

The WAP program also has developed detailed procedures for identifying and resolving health and safety issues in clients’ homes. Some examples of the issues identified as part of the WAP audit and the ways that those issues are resolved include:

- **Equipment Operation and Safety** – Each combustion appliance (i.e., heating system, water heater, and stove/oven) is tested to assess whether it is operating properly. Equipment

problems may be resolved by cleaning and tuning the equipment, replacing the equipment, or deferring the housing unit until the equipment problem can be addressed.

- **Moisture and Indoor Air Quality Problems** – As part of the audit, the housing unit is examined to determine whether there are issues with moisture that are causing mold or mildew to form, and to assess whether the home has adequate ventilation to meet the ASHRAE 62.2 standards. Issues may be addressed by installing exhaust fans in the kitchen and/or bathrooms, sealing heating ducts, and fixing dryer vents.
- **Asbestos and Lead-Based Paint** – In some homes, the audit may find that there is asbestos in the siding or covering pipes, or lead-based paint on window frames that could be disturbed by weatherization activities. The WAP program has detailed procedures that describe how to prevent weatherization activities from exposing clients or crew members to these dangerous substances.

The FFY 2017 WAP Plan has a detailed Health and Safety Plan that should be reviewed by any organization that is weatherizing low-income housing units in Minnesota. One important part of that plan is information from a recent study by the Department to determine the incidence of major health and safety measures, and the average cost of those measures. That study found that the average cost per unit for health and safety measures for treated homes was \$2,461. Since the DOE limit on health and safety spending per unit is \$1,058, EAP/WX funding is used to supplement the spending for health and safety measures. This information should be useful for those IOU programs that are not implemented through co-funding with WAP service providers.

2.4 Summary of Low-Income Program Information

The information presented in this section of the report furnishes information that is useful to consider in the context of the implementation of utility low-income programs.

- **Low-Income Households** – The EAP and WAP programs clearly define the households that are income-eligible for their programs. The American Community Survey data for 2015 show that there are about 508,000 households that are income-eligible for those programs. That is about 24 percent of Minnesota's 2.15 million households.
- **Low-Income Housing Units** – Some important statistics about the housing units occupied by low-income households include: 50 percent are in single family homes and 36 percent are in large multifamily buildings; 57 percent are occupied by renters, but the share of units occupied by renters varies considerably by housing unit type; about 55 percent of low-income housing units heat with natural gas and 27 percent heat with electricity.
- **EAP Program** – In a recent program year, the EAP program served over 134,000 households with its heating assistance program, about 26 percent of all income-eligible households. The program also serves low-income households with an equipment repair and replacement program and a program that delivers energy education and budget counseling to clients, and by transferring funds to WAP.

- WAP Program – In a recent program year, the state WAP program had \$20.2 million available to train and monitor WAP program staff, and to deliver services to 1,782 low-income households. The Department’s WAP unit has developed detailed information on eligible housing units, service delivery quality control procedures, and client health and safety measures to guide the use of program funds.

The IOUs’ low-income programs can take advantage of these resources as they design and implement their low-income programs. However, it also is important for IOU program managers to understand how WAP program guidelines might limit the flexibility for IOU programs that combine resources with WAP funds, and to actively work with the Department’s WAP office and local service providers to ensure that IOU funds are used in the most effective way possible.

3.0 Analysis Framework

Each of the IOUs has developed a unique set of LI CIP programs designed to meet the needs of low-income customers in their service territory. In this section, we outline the analysis framework that is used to document the investments made by IOUs in their low-income programs, to characterize the way that the programs are designed and implemented, and to examine the projected performance of those programs.

3.1 Program Investments

In their Triennial Plans, IOUs document the investments that they plan for the programs that they will implement to fulfill their low-income program spending requirement. In their Annual Status Reports, the IOUs report on their accomplishments during the previous year compared to their Plans. They furnish information on the amount spent on the program and the number of buildings and/or housing units treated, as well as the number and type of installed measures.

This analysis focuses on the 2014 IOU Status Reports. It documents the following statistics:

- **Program Spending** – The amount the IOU spent on each program in their low-income segment in 2014. Note that reported spending amounts include program administration, marketing and intake, and service delivery.
- **Number of Buildings/Units** – To the extent that the data are available, we document the number of buildings and housing units served by the program. [Note: Some IOUs report only the number of measures installed, not the number of buildings or units served.]
- **Average Cost per Unit** – Where available, we compute the cost per housing unit served.

These statistics furnish the first level at which each program is examined. They show what share of IOU low-income program funding is spent on each program, how many buildings or households are served by the program, and the size of the investment that the program is making in each housing unit. Since each program usually targets a specific market segment or energy efficiency measure, the funding allocation and spending per unit statistics are important for understanding how low-income market segments are served by the IOU low-income programs.

3.2 Program Characteristics

It is useful to categorize programs in terms of the types of services offered to facilitate comparison among the utility programs. While there is no one best way to categorize programs, the following approach is usually effective for looking at low-income energy efficiency programs. It groups programs by market segment, program delivery procedures, and eligible energy efficiency measures.

3.2.1 Market Segment

The ways that energy efficiency services can be delivered and the types of energy efficiency measures that can be installed vary by factors such as housing unit type, equipment location, ownership status, and bill payment type.

- **Building Type** – Energy efficiency services delivered to single family homes can usually focus on just one housing unit, while those that deliver services to multifamily buildings need to examine the potential for both building- and unit-level measures. Within the broad categories of single family homes, it is often useful to separately examine manufactured housing, single family detached homes, and single family attached homes since each present unique service delivery challenges. Within the broad category of multifamily homes, it is often useful to further segment into small multifamily buildings (2-4 housing units) and other types of multifamily buildings (e.g., high rise buildings, urban multi-story walk-up buildings, and garden style apartment buildings).
- **Ownership Status** – When a household owns a housing unit, the program can work directly with the occupant on service delivery procedures. When the housing unit is occupied by a tenant, both the owner and the tenant need to be consulted on service delivery. In some cases, a low-income owner lives in a small multifamily building and rents out the other units to tenants.
- **Equipment Location** – For multifamily buildings, there is an added factor of the location of heating, cooling, and water heating equipment. Some buildings have central equipment that serve all the housing units while others have separate equipment for each housing unit (i.e., apartment) within the building.
- **Bill Payment** – In rental units, differences in bill payment responsibilities can have a major impact on engagement of building owners and tenants. The most common types of arrangements are: renter pays for all energy uses, owner pays for all energy use, and owner pays for heating/water heating fuel and renter pays for baseload electricity.

The most effective analysis framework for low-income programs segments programs by housing unit type, owner/renter status (for single family housing units), and equipment location (for multifamily units). However, for this analysis, a different framework is used because of the way that the publicly funded and IOU programs have been designed and implemented.

Most programs in Minnesota have adopted the WAP definitions for single family and multifamily housing units. As discussed in Section 2 of the report, WAP defines single family homes to include buildings with two to four housing units, and considers buildings with five or more units to be multifamily buildings. Buildings are categorized in this way because measures for buildings with two to four housing units often have more in common with single family homes than with larger multifamily buildings.

For purposes of this analysis, we restrict our characterization of programs to an assessment of whether they serve single family homes or multifamily buildings using the following definitions.

- Single Family Home Programs – Serve buildings with 1 to 4 housing units.
- Multifamily Building Programs – Serve buildings with 5 or more housing units.

Where the data are available, we supplement the discussion of each program with information on other program design features, including information on whether both owner-occupied and rental units can be treated and whether the program includes or excludes manufactured housing.

3.2.2 Program Delivery Procedures

There are important differences in program delivery procedures for low-income programs, both within the set of programs delivered by IOUs and between the IOU program portfolios. These differences in delivery procedures often result in quite different program outcomes.

- Comprehensive vs. Limited – The dominant type of program implemented by the IOUs is comprehensive. In these programs, the service provider conducts a comprehensive assessment of the housing unit or building to identify the full range of cost-effective energy efficiency measures. However, the IOUs also implement programs that offer a more limited set of energy efficiency measures that often are installed in a single visit to the housing unit or building. In these programs, the service provider may identify other energy efficiency measures that are needed in the home, but will only install the specific measures targeted by the program protocol. [Note: The WAP program delivers comprehensive services to housing units.]
- Co-Funding vs. Single Funding Source – Some of the IOU programs contract with WAP service providers to deliver program services in conjunction with their WAP service delivery. In those programs, the WAP service provider most often uses the LI CIP funds to pay for one or more energy efficiency measures as part of a more comprehensive job. Other IOU programs contract with independent service providers to deliver all services with the IOU funds.
- Direct Payment for Services vs. Efficiency Measure Rebates – Some of the IOU programs pay the contractor directly for program services. In these programs, the customer does not have to pay for the services, but the customer also does not get to choose what energy efficiency measures are installed. In a measure rebate program, the customer decides what measures to install and gets an incentive payment from the IOU to cover part of the cost of the efficiency measure.

The IOU programs will be characterized using the following design parameters.

- Program Type
 - Comprehensive Program – IOU pays contractor to conduct a comprehensive assessment and to install all efficiency measures that meet program guidelines.
 - Direct Install – IOU pays contractor to deliver a limited set of energy efficiency services, usually in a single visit to the housing unit.

- Measure Rebates – IOU develops a list of eligible program measures and a schedule for measure rebates. Customer works with Independent contractor to select and install measures. IOU pays rebate to customer.
- Intake/Verification Source – Since low-income programs are restricted to customers who meet certain program requirements, the intake source and income verification procedures can have a significant impact on how much it costs to market the program and on what types of customers participate. The analysis categories are:
 - EAP/WAP/CIP Application – Service delivery agencies that have access to the eHeat database recruit certified clients for program services.
 - Utility Payment Programs – Some IOU programs use the utility’s payment program records to identify and recruit income-eligible clients.
 - Lists of Low-Income Multifamily Buildings – The Department’s guidance on the definition of a low-income building identifies a number of lists of low-income buildings that some IOUs use to recruit such buildings for multifamily programs.
 - Other – For other programs, the IOU and the contractor will jointly market the program services and the contractor will conduct income verification procedures.
- Service Provider – Many IOUs use WAP service delivery agencies to deliver their low-income programs, particularly those programs that deliver comprehensive services. However, some IOUs use other types of service providers. It is important to document the service provider for each program to understand the context in which the program is implemented and the potential for coordination with other program funding sources.
- Coordination with WAP/EAP – The Department encourages IOUs to coordinate with EAP in terms of customer recruitment and income verification, and with WAP in terms of service delivery. Such coordination can increase the Department’s confidence that the programs are serving verified low-income customers and that appropriate health and safety protocols and quality control procedures are being followed. In the analysis, we identify whether the program coordinates with EAP and WAP, and in what way that coordination takes place.
- Coordination with Electric / Natural Gas Programs – Most of the IOUs are single fuel utilities, delivering either natural gas or electricity. By coordinating their programs with another utility – for example, if CPE, which delivers natural gas, coordinates its low-income program with an electric IOU that covers the same service territory – it can potentially increase the total benefits to the participating customer and can reduce cost of the program by sharing the fixed costs of marketing, intake, and service delivery.
- Program Incentives – For the comprehensive and direct install low-income programs, the IOU usually pays a service delivery contractor to install the energy efficiency measures at no cost to the occupant. [Note: For some rental units, a building owner will be asked to pay for part of the cost of service delivery.] For measure rebate programs, the building owner installs the energy efficiency measure and then is paid a rebate that covers part or all the cost of the measure.

Each of these parameters related to the design and implementation of an IOU's low-income programs can affect the program's performance. These parameters will be documented for each IOU program for comparison with other programs.

3.2.3 Energy Efficiency Measures

The U.S. Energy Information Administration categorizes energy end uses into five categories: space heating, air conditioning, water heating, refrigeration, and other. Most energy efficiency programs would further break the "other" category into lighting and appliances. Energy efficiency measures are designed to reduce the energy consumption for one or more of those end use categories.

- **Building Shell Measures/Weatherization** – Weatherization measures (e.g., air sealing and insulation) reduce consumption by increasing the retention of heat in the winter and cooling in the summer.
- **Energy-Efficient Equipment** – For each end use, high-efficiency equipment delivers the same service to the household using less energy than the existing equipment. Examples of measures range from high efficiency furnaces and central air conditioners to LED lightbulbs and energy efficient clothes washers.
- **Distribution System Measures** – Housing units usually have systems to distribute the warm air, cool air, and/or hot water throughout the home. Air sealing and insulating heating and/or cooling ducts and insulating water pipes can reduce the distribution losses in a home.
- **Behavioral Measures** – Some measures are focused on ensuring that households use energy more efficiently. Measures such as setback thermostats and energy efficient showerheads can reduce the amount of energy used for space heating or cooling and for water heating, respectively.
- **Health and Safety Measures** – Many low-income housing units have equipment that is malfunctioning or have other conditions in the housing unit that put the household at risk. Sometimes these problems are acute; the household is at risk from the identified problems. In other situations, the problems present a barrier to installation of energy efficiency measures (i.e., installation of the measure could cause health and safety problems). While these measures sometimes have energy savings penalties (i.e., they increase the amount of energy used in the home), they are required prior to installation of energy efficiency measures. It is important to document how each program handles these issues.

Since these measures are very different in their costs, delivery mechanisms, and energy savings impacts, the analysis in this report characterizes the IOU energy efficiency programs in terms of the types of energy efficiency measures installed to facilitate comparison among programs.

The analysis examines natural gas and electric program separately because the number and type of available energy efficiency measures available for natural gas programs is quite different from those generally available for electric programs.

- Natural Gas - In most homes that use natural gas in Minnesota, the major uses are for space heating and water heating. The primary energy efficiency measures available are weatherization, heating and water heating equipment measures, distribution system measures, and behavioral measures that affect usage of space heating or water heating (e.g., thermostat, energy efficient showerheads).
- Electricity – Most Minnesota low-income housing units will use electric for cooling, refrigeration, lighting, and appliances. Some homes use electricity for space heating and/or for water heating. Many homes use electricity for the central forced air heating distribution system.

Natural gas energy efficiency programs are usually characterized as having relatively fewer measures that are relatively expensive to install. Electric energy efficiency programs are usually characterized as having relatively more individual energy saving opportunities that are comparatively less expensive to install.

One other way in which the analysis by energy source differs is that the electric IOU program analysis also documents whether the low-income programs have taken advantage of the Department guidance that allows electric utilities to deliver space heating and water heating services to households that use a delivered fuel, or in certain circumstances natural gas, and their heating or water heating fuel.

3.3 Program Performance

It is important to document the performance of the low-income programs. While the IOUs are not required to ensure that low-income programs are cost-effective, it is useful to understand the amount of energy savings delivered by each program, the average energy savings accruing to each housing unit, and the relative cost-effectiveness of the programs.

The measures of program performance reported by the IOUs and examined in this memo include:

- First-Year Energy Savings – The total amount of projected first-year energy savings (measured in dekatherms for natural gas IOUs and kWh for electric IOUs) for the program. [Source: 2014 Annual Status Report]
- Utility Cost per Unit of First-Year Savings – The program cost divided by the projected first-year energy savings. [Source: 2014 Annual Status Report]
- First-Year Savings per Housing Unit – The total projected first-year savings divided by the number of program participants. [Source: Computed]
- Utility Cost Test – Compares the net present value of benefits to the utility to the utility cost of program services. [Source: 2014 Annual Status Report]
- Societal Cost Test – Compares the net present value of all program benefits to all program costs. [Source: 2014 Annual Status Report]

There are several important issues with the reliability of this reported information and comparability of information among programs implemented by the IOUs.

- Projected Savings – The energy savings reported by IOUs are based on technical estimates supplied by the Minnesota Technical Reference Manual (TRM), the NEAT audit, or another procedure. There are several issues with the projected savings, including:
 - Baselines – For most equipment measures, the TRM uses a “replace on failure” method where the baseline energy efficiency is based on the efficiency of standard replacement equipment and energy savings is based on the difference between standard efficiency and the high-efficiency equipment installed. In comparison, the NEAT model compares “existing conditions” to “post-treatment” conditions to calculate savings. Those two approaches yield quite different outcomes in terms of energy saving.
 - Verification - The estimates of energy savings are accurate only if the measure was installed in a way that matches the technical assumptions. The regulatory framework does not require IOUs to implement measurement and verification (M&V) protocols for programs in the low-income segment and does not require IOUs to conduct low-income program evaluations. Savings verification procedures in other states have found that some programs achieve as little as 10 percent of projected savings while others are as high as 90 percent. Without verification procedures in place, it is inappropriate to suggest that resources should be diverted to programs with higher projected savings or high cost-effectiveness test values.
 - Examples – One example of the issues related to using “projected savings” to assess program performance can be illustrated from the 2017-2019 IOU Triennial Plans. In CPE’s plan, they project average savings of 6.8 Dth from the installation of an 83.5% boiler. In Xcel’s plan, they project 3.0 Dth from an 84% boiler. In MERC’s plan, they project 11.5 Dth from an 84% boiler for their Low-Income Weatherization Program and 28.84 Dth for their 4U2 program. CPE projects average savings of 8.4 Dth for air sealing and 9.1 Dth for attic insulation. Xcel projects 6.0 Dth of savings for attic insulation with bypass air sealing and 6.0 Dth for air sealing. MERC projects 20.3 Dth for “weatherization” for the Low-Income Weatherization Program and 53.41 Dth for “weatherization” in their 4U2 program. While each of these savings projections could be realized under different program scenarios, it is very difficult to compare program performance when the assumptions differ to this extreme.
- First-Year Savings – These are first-year savings only. Installed measures have a useful life that varies from just a few years to as long as 20 years. As such, it is difficult to use these data to compare two programs, unless the programs deliver the same kinds of measures.
- Ratepayer Costs vs. Total Costs – In some cases, the ratepayers pay the entire cost of services (e.g., weatherization) while in others, the ratepayers only pay for part of the cost of the measure (e.g., multifamily equipment rebates). When comparing programs that have different types of incentives, it is important to know that the cost per unit of savings is only the utility cost per unit of savings, not the measure cost per unit of savings. While that is an important metric for assessing the ratepayer program, it is not as useful when considering the value of the measure to all parties involved in the transaction.

Cost-effectiveness tests help to make the comparisons across programs somewhat more meaningful in that they include all the energy savings that will result from a program rather than just the savings in the first year of the program. In addition, the societal cost test shows how the cost-effectiveness of installed measures compare when all the costs are included in the analysis. However, even for cost-effectiveness tests, the limitation of having projected, rather than verified energy savings is still problematic for identifying the highest performing programs.

3.4 Analysis Framework

Section 4 of this memo furnishes an inventory of the IOU natural gas programs and Section 5 furnishes and inventory of the IOU electric programs. Each IOU's programs are characterized in the terms of the following parameters.

- Program Investments – Funding, housing units, and average investment per housing unit.
- Program Targets and Delivery Procedures – Identifies type of buildings targeted and the approach taken to service delivery.
- Program Design Parameters – Includes information about program marketing/intake, service provider(s), program coordination, and financial incentives.
- Energy Efficiency Measures – Furnishes detailed information about the types of energy efficiency measures, including health and safety measures that are installed by the program.
- Program Performance Statistics – Documents the available information on program performance, including the first-year projected savings, the utility cost test, and the societal cost test.

These data are used to compare the programs implemented by each IOU. They also are used to show comparative investments among the IOUs by program type and to identify individual IOU programs that deliver a unique set of program services

4.0 Natural Gas IOU Low-Income Programs

The five natural gas IOUs are required to spend 0.4 percent of their three-year average residential gross operating revenues on low-income programs. The statute defines low-income programs as "energy conservation improvement programs that directly serve the needs of low-income persons, including low-income renters." The section of the report furnishes detailed information on the programs implemented by each natural gas IOU to meet this requirement.

The natural gas IOUs and their 2014 spending requirements were:

- CenterPoint Energy (CPE) - \$2,281,250
- Xcel Energy (Xcel) - \$1,220,202
- Minnesota Energy Resources Corporation (MERC) - \$592,374
- Great Plains Natural Gas (GPNG) - \$54,662
- Greater Minnesota Gas (GMG) - \$14,432

The section of the report also compares the characteristics and performance of the programs implemented by all the natural gas IOUs.

4.1 CPE Natural Gas LI CIP Programs

In 2014, CPE implemented a comprehensive set of LI CIP programs that addressed a diverse set of program opportunities. The programs included:

- Low-Income Weatherization Project – Delivered comprehensive energy efficiency services to owner-occupied and rental single family homes (1-4 units).
- Non-Profit Affordable Housing Project – Paid rebates to affordable housing organizations for energy efficiency measures installed in single family homes (1-4 units) being constructed or renovated for occupancy by low-income households. Some of the housing constructed by the organizations is designated to become owner-occupied while other projects are for the development of rental housing.
- Low-Income Multifamily Building Rebate Project – Paid rebates to owners of multifamily buildings for installation of heating equipment and water heating equipment in commercially-metered low-income multifamily buildings (5+ units).
- Low-Income Heating System Tune-Ups – Delivered furnace and boiler tune-ups and safety checks to owner-occupied and rental single family homes (1-4 units).
- Low-Income Rental Efficiency Project – Worked with building owners to deliver comprehensive services to single family homes occupied by renters (1-4 units).

Table 14 furnishes summary information about each of the programs. The Weatherization Project accounted for about 80 percent of CPE's LI CIP spending. The Weatherization Project, Non-Profit

Affordable Housing Project, and Rental Efficiency Project all made a significant investment in each housing unit served. The Multifamily Building Rebate Project affected the largest number of housing units; 22 buildings and 2,327 housing units. The Heating System Tune-Ups program made a much smaller investment per home but affected a relatively large number of low-income housing units.

Table 14. CPE LI CIP Program Summary – 2014

Program Name	Building Type	Program Type	Spending	Participants		Spending per Unit
				Buildings	Units	
Weatherization	Single Family	Comprehensive	\$1,779,574	511 housing units		\$3,482
Non-Profit Affordable Housing	Single Family	Measure Rebates	\$163,593	75 housing units		\$2,181
Multifamily Building	Multifamily	Measure Rebates	\$118,839	22	2,327	\$51
Heating System Tune-Ups	Single Family	Direct Install	\$79,283	751 housing units		\$105
Rental Efficiency	Single Family	Comprehensive	\$65,996	5	8	\$8,250
TOTAL	Mixed	Mixed	\$2,207,285	1,364	3,672	\$601

Some important caveats about the 2014 investment in these programs includes:

- Low-Income Weatherization Project – The program implementer for Weatherization was replaced during 2014 causing the program to fall short of goals. In 2015, the program spent \$1,952,925 to serve 402 housing units, an average investment of \$4,858 per housing unit.
- Rental Efficiency Project – In the second year of the program (2015) the program served 50 buildings with 75 housing units at a cost of \$3,267 per housing unit. That investment level is comparable to the investment per housing unit by the Weatherization Project and the Non-Profit Affordable Housing Project.
- Heating System Tune-Up – This program is categorized as direct install because CPE pays the service provider directly for delivering these limited services.

CPE also furnished documentation on the number of low-income households that participate in their residential segment programs determined by matching customer EAP records and program records. Their 2014 Status Report estimates that 10,580 low-income households participated in the market rate programs, of which 1,363 received major equipment rebates (heating or water heating equipment)².

² It is useful to note that some of those customers could have been served by the EAP ERR program. In that program, the service delivery agencies instruct the heating system contractor to apply for a utility rebate and to apply that credit against the cost of service.

Table 15. CPE LI CIP Program Targeting, Design, and Implementation

Program Name	Intake Source	Service Provider(s)	Coordination with Electric Programs	Coordination with WAP/EAP	Program Incentives
Weatherization	WAP	SRC with WAP subcontractors	Yes	Yes	Pays service provider for cost of installed measures
Non-Profit Affordable Housing	CPE in collaboration with: <ul style="list-style-type: none"> Habitat for Humanities Greater Metropolitan Housing Corporation Project for Pride in Living 		No	No	Pays organization rebate for 100% of incremental cost of energy efficiency upgrade over code
Multifamily Building	CPE / LIRC listings ³	CPE	No	No	Pays building owner rebates higher than those for the market rate program
Heating System Tune-Ups	CPE	CPE Home Service Plus	No	No	Pays service provider for cost of installed measures
Rental Efficiency	Energy Cents	Energy Cents	No	No	CPE pays 50% of the service delivery cost and building owner pays 50%.

Table 15 furnishes detailed information about the implementation of each CPE LI CIP program. Some points of interest include:

- **Program Implementer** – The Weatherization Project was implemented by the Sustainable Resource Center (SRC), a WAP service provider. SRC both completed weatherization jobs and supervised the work of other WAP service providers. CPE directly managed the delivery of services in the Non-Profit Affordable Housing Project, the Multifamily Building Project, and the Heating System Tune-Ups Project. Energy Cents (a nonprofit organization) implemented the Rental Efficiency Project.
- **Program Coordination** – The Weatherization Project was coordinated with WAP since it was delivered by WAP service providers. Since SRC and the WAP service providers delivered the Xcel electric HESP program in the same service territory, the natural gas and electric services was coordinated for those housing units. The other LI CIP programs did not explicitly coordinate with the electric utility programs or with WAP or EAP.
- **Program Incentives** – The program incentives were calculated in a different way for each type of program, including direct payment to the service provider and measure rebates.

³ The LIRC – Low Income Rental Certification – list furnishes information on the eligibility of a building for lower tax rates.

One important issue is the amount that building owners must contribute to the cost of energy efficiency measures. The CPE programs are inconsistent in how much building owners are required to contribute. The Weatherization Project follows the WAP rules and allows local service providers to work with building owners to determine how much they must contribute to the cost of services. The Non-Profit Affordable Housing Project only pays the organization for the incremental cost of the energy efficiency measure, not the entire cost. In the Rental Efficiency Project, the building owner must pay 50% of the cost for measures.

Table 16 furnishes information on the eligible efficiency measures for each program. The three programs that serve single family homes – Weatherization, Non-Profit Affordable Housing, and Rental Efficiency – each offers an incentive for a comprehensive set of program services. The Multifamily Building program is more focused on replacement of major equipment. The Heating System Tune-Up program is narrowly focused on heating equipment efficiency.

Table 16. CPE LI CIP Program Measures

Eligible Measures	Weatherization	Non-Profit Affordable Housing	Multifamily Building	Heating System Tune-Ups	Rental Efficiency
Weatherization Measures	Yes	Yes	No	No	Yes
Equipment Measures / Replacement or Upgrade	No	Yes	Yes	No	Yes
Equipment Measures / Tune-Up/Repair	Yes	No	Yes	Yes	Yes
Distribution System Measures	No	No	No	No	No
Behavioral Measures	Yes	Yes	No	No	Yes
Health and Safety Measures / Equipment	Yes	No	No	No	No
Health and Safety Measures / Ventilation	No	No	No	No	No

Table 17 furnishes information on CPE-reported program accomplishments, including estimated first-year energy savings, average first-year savings per housing unit, and the cost per first-year MCF saved. It shows that the diverse set of program services and incentive types offered by the CPE low-income programs differ quite a bit in terms of the performance metrics presented in this table. Some important findings include:

- **First-Year Savings per Unit** – The savings per unit were highest for Weatherization, Non-Profit Affordable Housing, and Rental Efficiency. Those programs deliver a more comprehensive set of services.

- **Cost per First-Year Savings** – Among the three more comprehensive programs, the Non-Profit Affordable Housing had the lowest cost per first-year savings and the highest values for the cost-effectiveness tests. The Multifamily Building and Heating System Tune-Up programs had much lower cost per first-year savings.
- **Cost Effectiveness** – The societal cost test shows that both the Non-Profit Affordable Housing and Multifamily Building programs were estimated to be cost-effective. The Weatherization and Rental Efficiency programs were estimated to have similar societal cost-effectiveness ratios.

However, these differences in performance are less compelling than they might be if the energy savings values were validated through measurement and verification procedures or program evaluations.

Table 17. CPE LI CIP Program Accomplishments

Program Name	Actual Spending	Units	First-Year Energy Savings (MCF)	Savings per Unit (MCF)	Utility Cost per MCF Saved	Utility Cost Test	Societal Cost Test
Weatherization	\$1,779,574	511	9,521	18.63	\$186.92	0.42	0.60
Non-Profit Affordable Housing	\$163,593	75	1,841	24.55	\$88.86	0.94	5.95
Multifamily Building	\$118,839	2,327	9,165	3.93	\$12.97	5.15	2.11
Heating System Tune-Ups	\$79,283	751	1,352	1.80	\$58.64	0.20	0.22
Rental Efficiency	\$65,996	8	107	13.38	\$616.79*	0.15*	0.21 ^a
TOTAL	\$2,207,285	3,672	21,986	5.99	\$100.40	0.71	0.91

a. In 2015 CPE the utility cost per MCF saved was \$156.22, and the cost-effectiveness test values were 0.63 and 0.63 respectively.

Since the Weatherization Project serves both owner-occupied and rental units, one might ask why the Rental Efficiency Project is needed. There are two reasons why it makes sense for an IOU to add such a program. First, the Weatherization Project does not serve very many renters. The statistics in Table 11 shows that 27 percent of low-income single family homes are occupied by renters. The CPE program statistics show that less than 10 percent of Weatherization Project homes were occupied by renters. One important difference in the two programs is that the Weatherization Project is marketed to the renters while the Rental Efficiency Program is marketed to building owners. Despite the relatively small investment in the program, the Rental Efficiency Project served more low-income renters in 2015 year than did the Weatherization Project.

The Non-Profit Affordable Housing program also is unique among IOU gas programs. It is important in that it makes sure that newly developed low-income housing has high efficiency rather than standard efficiency equipment and shell measures.

4.2 Xcel Natural Gas LI CIP Programs

In 2014, Xcel was the only IOU that delivered both natural gas and electric services. For comparability with the other IOUs, we present information on each fuel separately.

The Xcel natural gas LI CIP programs included:

- Home Energy Savings Program (HESP) – Delivered comprehensive energy efficiency services to owner-occupied and rental single family homes (buildings with one unit).
- Low-Income Home Energy Squad Program (LI-HES) – Delivered low-cost measures to owner-occupied and rental single family homes (buildings with one unit).

Table 18 furnishes summary information about each of the programs. About 80 percent of the spending was allocated to HESP and 20 percent was allocated to LI-HES. HESP made a larger investment in each home, while LI-HES served a larger number of homes with more limited services.

Table 18. Xcel Natural Gas LI CIP Program Summary - 2014

Program Name	Building Type	Program Type	Actual Spending	Units	Spending per Unit
Home Energy Savings Program	Single Family	Comprehensive	\$1,426,746	457	\$3,122
Low-Income Home Energy Squad	Single Family	Direct Install	\$364,712	1,466	\$249
TOTAL	Single Family	Mixed	\$1,791,458	1,923 ^a	\$987

- a. Sometimes a household who receives HES services will be referred to HESP. It is possible that the total housing units served is less than 1,923 if there is duplication between the two programs.

Table 19 furnishes detailed information about the implementation of each Xcel natural gas LI CIP programs. Some points of interest include:

- Program Implementer – SRC administered HESP in the western metropolitan area and outstate regions; SRC is a WAP service provider. Energy Cents administered HESP in the eastern metropolitan area; Energy Cents is a nonprofit organization. The Neighborhood Energy Center (NEC) administered the Home Energy Squad program; NEC is a nonprofit organization. Throughout this report, we refer to the portion of the HESP program administered by SRC as HESP West and the portion administered by Energy Cents as HESP East.
- Program Coordination – Where HESP is administered by SRC, it is coordinated with WAP. Where HESP is administered by Energy Cents, it is not coordinated with WAP. In both locations, the delivery of natural gas and electric services often are coordinated. Where HESP is administered by SRC, the WAP service providers often can deliver WAP-funded services, CIP natural gas

services, and CIP electric services to the same housing unit. Where it is administered by Energy Cents, the project delivers both CIP natural gas and CIP electric services to clients since Energy Cents has contracts with Xcel to deliver both types of services.

- **Program Incentives** – For both HESP and LI-HES, the Xcel program pays the service providers to deliver the services to the income-qualified household and housing unit. For HESP, the local service provider works with building owners to determine if an owner contribution is required. The LI-HES program has no co-payment requirements for housing units occupied by low-income households.

The main differences in the HESP and LI-HES programs are the recruitment/intake procedures and the comprehensiveness of the measures.

Table 19. Xcel Natural Gas LI CIP Program Targeting, Design, and Implementation

Program Name	Intake Source	Service Provider(s)	Coordination with Electric Programs	Coordination with WAP/EAP	Program Incentives
HESP West	WAP	Sustainable Resources Center (SRC)	Yes	Yes	Pays service provider for cost of installed measures
HESP East	Xcel energy assistance programs	Energy Cents	Yes	No	Pays service provider for cost of installed measures
LI-HES	Xcel/NEC	Neighborhood Energy Connection (NEC)	Yes	Yes	Pays service provider for cost of installed measures

One important issue identified in the review of the 2017-2019 Triennial Plan is that Xcel proposed to expand the HESP program to include small multifamily buildings (i.e., buildings with 2 to 4 housing units); the Department asked questions about the procedures for determining the amount that building owners would need to contribute to program services. In 2014, the program only served single family homes that were in buildings with one housing unit. While there was no information about building owner contributions in the 2013-2015 plan, we assume that the program followed the WAP protocol and allowed the local service delivery agency to negotiate with the building owner. Xcel proposed the same approach for the program when it expanded to include housing units in buildings with 2-4 units. However, in their review of the 2017-2019 Triennial Plan filing, the Department suggested that Xcel should require that all building owners make a specific contribution to the cost of energy efficiency measures. The final Commissioner’s decision ordered Xcel to require building owners to pay for 50

percent of the cost of measures when the building owner pays for the cost of the fuel used by the installed measure or equipment.

Table 20 furnishes information on gas efficiency measures that are eligible for each program. HESP has separate audit and measure installation visits, and a comprehensive set of energy efficiency measures. LI-HES delivers a more limited set of measures in one visit.

Table 20. Xcel Natural Gas LI CIP Program Measures

Eligible Measures	HESP	LI-HES
Weatherization Measures	Whole House	Limited
Equipment Measures / Replacement or Upgrade	Yes	No
Equipment Measures / Tune-Up/ Repair	Yes	No
Distribution System Measures	No	Yes
Behavioral Measures	No	Yes
Health and Safety Measures / Equipment	No	No
Health and Safety Measures / Ventilation	Yes	No

Table 21 furnishes information on Xcel-reported program accomplishments, including estimated first-year energy savings, average first-year savings per housing unit, and the cost per first-year Dth saved. Some important findings include:

- First-Year Savings per Unit – The savings per unit were highest for HESP; the program delivers a more comprehensive set of services than does LI-HES.
- Cost per First-Year Savings – LI-HES has a lower cost per first-year savings; it is projected to deliver about one-half the first-year savings for less than 10 percent of the cost of HESP.
- Cost Effectiveness – The societal cost test shows that LI-HES is projected to be more cost-effective, but the difference in the cost-effectiveness ratios is not as great as the difference in the cost per first-year savings estimate. HESP delivers services that are expected to have a longer measure life than those provided through LI-HES.

However, these differences in performance are less compelling than they might be if the energy savings values were validated through program evaluations that measure savings using billing data analysis.

Table 21. Xcel Natural Gas LI CIP Program Accomplishments

Program Name	Actual Spending	Units	First-Year Energy Savings (Dths)	Savings per Unit (Dths)	Utility Cost per Dth Saved (First-Year)	Utility Cost Test	Societal Cost Test
Home Energy Savings	\$1,426,746	457	7,263	15.89	\$196.44	0.41	0.66
Low Income Home Energy Squad	\$364,712	1,466	12,413	8.47	\$29.38	0.81	1.43
TOTAL	\$1,791,458	1,923	19,676	10.23	\$96.13	0.53	0.90

LI-HES is unique among IOU gas programs. This direct install program is offered both in the residential program segment and in the low-income program segment. It is offered for free to low-income households and appears to deliver significant savings. In addition, the program also can serve to identify housing units that need more comprehensive services.

However, before other IOUs adopt this program model, it is important that Xcel verify the projected energy savings. Since Xcel conducts measurement and verification procedures on this project, the savings estimates should be reliable in terms of verification that specified measures were installed. But, it would be appropriate for Xcel to directly measure the projected program impacts using billing data analysis techniques.

4.3 MERC LI CIP Programs

In 2014, MERC implemented LI CIP programs that serve single family homes (1-4 units) and small multifamily buildings (5 to 8 housing units). [Note: Both programs serve owners and renters but exclude mobile homes.] The programs included:

- Low-Income Weatherization Project – Delivered comprehensive services to single family homes (1-4 units) in housing units occupied by households with income at or below the WAP income threshold.
- 4U2 Program – Delivered comprehensive services to single family homes and multifamily buildings with up to 8 housing units. In addition to WAP income-eligible households, the 4U2 program serves households with income above the WAP income threshold but below 300% of the poverty guideline. Both WAP-eligible and moderate-income households in the program are asked to make a modest \$150 copay toward the cost of program services that can be waived under certain circumstances. [Note: The 2014 report indicated that 53 percent of participants had income at or below the WAP income threshold.]

Table 22 furnishes summary information about each of the programs. The Low-Income Weatherization Project accounted for about 30 percent and the 4U2 program accounted for about 70 percent of total spending. Both programs offer comprehensive services to participating households.

In addition to these dedicated low-income projects, MERC installs free low-flow showerheads and faucet aerators for low-income tenants as part of the C&I Multifamily Direct Install Plus program. That program is not reported as part of MERC's low-income program segment.

Table 22. MERC Natural Gas LI CIP Program Summary - 2014

Program Name	Building Type	Program Type	Actual Spending	Units	Spending per Unit
Low-Income Weatherization	Single Family	Comprehensive	\$288,493	86 units ^a	\$3,355
4U2 Program	Single Family and Multifamily	Comprehensive	\$662,259	99 units ^b	\$6,689
TOTAL	Mixed	Comprehensive	\$950,752	185	\$5,139

a. MERC reports a duplicated count of 124 measures that counts weatherization and equipment for same housing unit separately.

b. MERC reports a duplicated count of 219 measures that counts audits, weatherization, and equipment separately

Table 23 furnishes detailed information about the implementation of each LI CIP program. Some points of interest include:

- **Program Implementer** – The Weatherization Project was implemented by the Sustainable Resource Center—a WAP service provider—which both conducted weatherization projects and supervised the work of other WAP service providers. The 4U2 program was implemented by Franklin Energy, a for-profit company.
- **Coordination** – Low-Income Weatherization was delivered by WAP service providers in coordination with the WAP program. The program was coordinated with electric programs if the WAP service provider also had a contract with an electric IOU in the same area. The 4U2 program was not coordinated with WAP service delivery, but did receive referrals of over-income households who applied for the WAP program. The 4U2 program was not coordinated with the delivery of electric energy efficiency measures.
- **Program Incentives** – MERC paid the service provider for the cost of service delivery for both programs. In the Low-Income Weatherization program, some services were paid for by WAP while others were paid for by MERC. MERC paid all costs for the 4U2 program.

Table 23. MEC Natural Gas LI CIP Program Targeting, Design, and Implementation

Program Name	Intake Source	Service Provider(s)	Coordination with Electric Programs	Coordination with WAP/EAP	Program Incentives
Low-Income Weatherization	WAP	SRC w/WAP subcontractors	Yes	Yes	Pays service provider for cost of installed measures
4U2 Program	Franklin Energy MERC WAP	Franklin Energy	No	Yes / Over-Income Referrals	Pays service provider for cost of installed measures

MERC did not report on the requirements for building owner contributions in either their Triennial Plan or their 2014 Status Report. Since the Low-Income Weatherization program is delivered by WAP agencies and the Commissioner ordered MERC to use the Weatherization Assistant to determine energy savings and to use WAP health and safety protocols for the 4U2 program, it is expected that the WAP rules for building owner contributions were applied. The WAP rules give the service provider the responsibility of negotiating payment levels with the building owner for buildings with 1 to 4 housing units and require building owner contributions for buildings with 5 or more units.

Table 24 furnishes information on gas efficiency measures that are eligible for each program. Both programs offered comprehensive weatherization measures along with some health and safety replacements of heating and water heating equipment. In addition, the 4U2 program allowed program participants to pay for measures that do not have a savings-to-investment ratio of 1.0 or more.

Table 24. MERC Natural Gas LI CIP Program Measures

Eligible Measures	Weatherization	4U2
Weatherization Measures	Yes	Yes
Equipment Measures / Replacement or Upgrade	No	No
Equipment Measures / Tune-Up/ Repair	No	No
Distribution System Measures	No	Yes
Behavioral Measures	No	Yes
Health and Safety Measures / Equipment	Yes	Yes
Health and Safety Measures / Ventilation	Yes	Yes

Table 25 furnishes information on MERC-reported program accomplishments, including estimated first-year energy savings, average first-year savings per housing unit, and the cost per first-year Dth saved. Some important findings include:

- **First-Year Savings per Unit** – The savings per unit were highest for the 4U2 program. Since, the Low-Income Weatherization program is co-funded with WAP, it delivered fewer measures per home since MERC only paid for a subset of the measures installed in the home. The average cost per unit for the Low-Income Weatherization program was \$3,355 compared to an average cost of \$6,689 for the 4U2 program.
- **Cost per First-Year Savings** – Low-Income Weatherization had a lower cost per first-year savings.
- **Cost Effectiveness** – The societal cost test showed that the Low-Income Weatherization program was projected to be cost-effective based on the societal cost test, but the 4U2 program was not.

However, these differences in performance are less compelling than they might be if the energy savings values were validated through M&V procedures and program evaluations that measure savings using billing data analysis.

Table 25. MERC Natural Gas LI CIP Program Accomplishments

Program Name	Actual Spending	Units	First-Year Energy Savings (Dths)	Savings per Unit (Dths)	Utility Cost per Dth Saved	Utility Cost Test	Societal Cost Test
Low-Income Weatherization	\$288,493	86	2,733	31.78	\$105.56	0.84	1.40
4U2 Program	\$662,259	99	5,406	54.61	\$122.50	0.49	0.68
TOTAL	\$950,752	185	8,139	43.99	\$120.33	0.60	0.88

The 4U2 program is unique among IOU gas programs in two ways. First, the program delivers services to households with incomes up to 300 percent of poverty, about 50 percent higher than the other comprehensive low-income programs that target customers with incomes up to 200 percent of poverty. Second, this program conducts outreach to customers who are not served by other low-income programs such as EAP. Even though over 50 percent of the 4U2 customers are verified to have income at or below the EAP income threshold, those customers are not currently participating in that program or other public assistance programs. In Section 2 of the report, we reported that EAP only serves about 27 percent of the income-eligible households. The 4U2 program serves some of those income-eligible households that do not participate. That can increase program costs, since the 4U2 program has to cover intake and income verification costs. However, it clearly serves an underserved population.

4.4 Great Plains Natural Gas LI CIP Programs

In 2014, Great Plains offered three different services to low-income households, including:

- CAP Weatherization – Delivered comprehensive services in collaboration with WAP service delivery to owner-occupied and rental single family homes (1-4 units) with occupants whose income is at or below the WAP income threshold.
- Furnace/Boiler Replacement – Replaced furnaces and boilers on an emergency basis for low-income homeowners.
- Furnace/Boiler Tune-Up – Offered tune-ups of furnaces or boilers for low-income households in owner-occupied or rental single family homes.

Table 26 furnishes summary information about each of the programs. CAP Weatherization accounted for about 60 percent of program spending and the Furnace Replacement program accounted for about 40 percent. It is likely that there is some overlap between the programs, but that is not documented in the GPNG report. One Furnace/Boiler tune-up was completed in 2014.

Table 26. GPNG Natural Gas LI CIP Program Summary - 2014

Program Name	Building Type	Program Type	Actual Spending	Units	Spending per Unit
CAP Weatherization	Single Family	Comprehensive	\$41,447	19	\$2,181
Furnace Replacement	Single Family	Direct Install	\$28,350	8	\$3,544
Furnace/Boiler Tune-Up	Single Family	Direct Install	\$108	1	\$108
TOTAL	Single Family	Mixed	\$69,905	28	\$2,497

The GPNG furnace programs are categorized as direct install, though they don't fit into any category very well. In both programs, GPNG pays the service provider for delivering the program service; the customer does not receive a rebate. However, they are not considered to be comprehensive programs because the service provider does not assess the need for other types of energy efficiency measures.

In addition to the low-income segment programs, Great Plains charges customers \$50 for Residential Energy Audits, but makes those available for free to low-income households.

Table 27 furnishes detailed information about the implementation of each LI CIP program. Some points of interest include:

- Program Implementer – In 2014, GPNG worked with four WAP service providers; three service providers delivered services to 3 customers each and one delivered services to 17 customers.
- Coordination – All low-income program services were delivered by WAP service delivery agencies. Those agencies can combine GPNG funding with their other funding sources, including both WAP funds and CIP electric program funds.

- Program Incentives – GPNG paid service providers for the cost of program measures delivered subject to a per home limit of \$1,800 for weatherization, \$2,500 for a furnace replacement, \$5,000 for a boiler replacement, and \$200 for a furnace/boiler tune-up.

The programs paid the service provider for the cost of the measures installed. The Home Energy Services program was available to renters. Since GPNG worked with WAP service providers, building owner contribution requirements are determined by the service provider. The Furnace Replacement program was only available to homeowners.

Table 27. GPNG Natural Gas LI CIP Program Targeting, Design, and Implementation - 2014

Program Name	Intake Source	Service Provider(s)	Coordination with Electric Programs	Coordination with WAP/EAP	Program Incentives
CAP Weatherization	WAP	WAP Service Providers	Yes	Yes	Pays service providers to a limit of \$1,800
Furnace Replacement	WAP	WAP Service Providers	N/A	Yes	Pays service providers to a limit of \$2,500 (furnace) or \$5,000 (boiler)
Furnace Tune-Up	WAP	WAP Service Providers	N/A	Yes	Pays service providers to a limit of \$200

Table 28 furnishes information on gas efficiency measures that were eligible for each program. The CAP weatherization program focuses on shell measures, while the furnace program focuses on emergency replacement of heating equipment.

Table 28. GPNG Natural Gas LI CIP Program Measures

Eligible Measures	Weatherization	Furnace Replacement	Furnace Tune-Up
Weatherization Measures	Yes	No	No
Equipment Measures / Replacement or Upgrade	No	No	No
Equipment Measures / Tune-Up/ Repair	No	No	Yes
Distribution System Measures	No	No	No

Eligible Measures	Weatherization	Furnace Replacement	Furnace Tune-Up
Behavioral Measures	No	No	No
Health and Safety Measures / Equipment	No	Yes	No
Health and Safety Measures / Ventilation	No	No	No

Table 29. GPNG Natural Gas LI CIP Program Accomplishments

Program Name	Actual Spending	Units	First-Year Energy Savings (Dk)	Savings per Unit (Dk)	Utility Cost per Dk Saved	Utility Cost Test	Societal Cost Test
CAP Weatherization	\$41,447	19	282	14.84	\$146.98	NR	NR
Furnace Replacement	\$28,350	8	279	34.88	\$101.61	NR	NR
Furnace Tune-Up	\$108	1	NR	NR	NR	NR	NR
TOTAL	\$69,905	28	561	20.04	\$124.61	0.78	1.37

NR = Not Reported

Table 29 furnishes information on GPNG-reported program accomplishments, including estimated first-year energy savings, average first-year savings per housing unit, and the cost per first-year Dth saved. Some important findings include:

- First-Year Savings per Unit – The savings per unit were highest for the Furnace Replacement program
- Cost per First-Year Savings – The first-year saving costs also was lower for the Furnace Replacement program than for the CAP Weatherization program.
- Cost Effectiveness – GPNG only reported cost-effectiveness at the segment level. They reported that the low-income programs were cost-effective based on the societal cost test.

However, these differences in performance are less compelling than they might be if the energy savings values were validated through M&V procedures and program evaluations that measure savings using billing data analysis.

4.5 Greater Minnesota Gas LI CIP Programs

In 2014, Greater Minnesota Gas offered a Residential Home Energy Services program in which eight low-income households participated. The Home Energy Services program was a measure rebate program. However, if the participating customers were found to be low-income, GMG paid NEC directly for the

entire cost of service delivery. In addition, GMG notified WAP service providers that they would pay for weatherization services for GMG customers that were being served by WAP; only one customer was served in this way in 2014. Table 30 furnishes summary information for all low-income program activity. The program spent a total of \$16,622 for nine housing units, an average of \$1,851 per housing unit.

Table 30. GMG Natural Gas LI CIP Program Summary – 2014

Program Name	Building Type	Program Type	Actual Spending	Units	Spending per Unit
Home Energy Services	Single Family	Comprehensive	\$16,622	9	\$1,851

Table 31. GMG Natural Gas LI CIP Program Targeting, Design, and Implementation

Program Name	Intake Source	Service Provider(s)	Coordination with Electric Programs	Coordination with WAP/EAP	Program Incentives
Home Energy Services	GMG / NEC	NEC	No	Yes	Pays service provider for cost of installed measures

Table 31 furnishes detailed information about the implementation of the LI CIP program. Some points of interest include:

- Program Implementer – In 2014, GMG worked with NEC on the Residential Home Energy Services program; NEC is a nonprofit organization. Eight low-income customers were identified and served through that program.
- Coordination – GMG alerted WAP service providers that they could help pay for WAP measures delivered to GMG customers. Such agencies could combine GMG funding with their other funding sources. Only one agency identified a GMG customer for the program in 2014. The program is not coordinated with electric energy efficiency programs.
- Program Incentives – GMG paid the service provider for the cost of an energy audit, including direct install measures, as well as follow-up measures installed in the homes.

Table 32 furnishes information on gas efficiency measures that were available. The program paid for both direct install measures and more comprehensive weatherization services.

Table 32. GMG Natural Gas LI CIP Program Measures

Eligible Measures	Home Energy Services
Weatherization Measures	Yes
Equipment Measures / Replacement or Upgrade	Yes
Equipment Measures / Tune-Up / Repair	Yes

Eligible Measures	Home Energy Services
Distribution System Measures	Yes
Behavioral Measures	Yes
Health and Safety Measures / Equipment	Yes
Health and Safety Measures / Ventilation	Yes

Table 33 furnishes information on reported program accomplishments, including estimated first-year energy savings, average first-year savings per housing unit, and the cost per first-year MCF saved. As noted above one limitation of this table is that it shows projected (not measured) first-year savings. The utility cost test and societal cost tests offer more information about the relative performance of the programs.

Table 33. GMC Natural Gas LI CIP Program Accomplishments

Program Name	Actual Spending	Units	First-Year Energy Savings (MCF)	Savings per Unit (MCF)	Utility Cost per MCF Saved	Utility Cost Test	Societal Cost Test
Home Energy Services	\$16,622	9	120.8	13.42	\$137.93	0.77	1.45

4.6 Summary Information on IOU Natural Gas Programs

Table 34 shows that the natural gas IOU LI CIP programs invested a substantial amount of funding in LI CIP programs in 2014; over \$5 million in spending that reached almost six thousand low-income households. However, the number of LI CIP housing units and the average spending per housing unit varies considerably among the utilities.

Table 34. 2014 Natural Gas LI CIP Program Summary

Utility	Building Type(s)	Program Type(s)	Program Spending	Units	Spending per Unit
CPE	Mixed	Mixed	\$2,207,285	3,672	\$601
Xcel Energy	Single Family	Mixed	\$1,791,458	1,923	\$932
MERC	Mixed	Comprehensive	\$950,752	185	\$5,139
GPNG	Single Family	Mixed	\$69,905	28	\$2,497
GMG	Single Family	Comprehensive	\$16,622	9	\$1,847

Utility	Building Type(s)	Program Type(s)	Program Spending	Units	Spending per Unit
All Programs	Mixed	Mixed	\$5,036,022	5,817	\$866

4.6.1 Comprehensive Single Family Home Programs

Table 35 shows that the natural gas IOUs invested about \$4.3 million to serve 1,189 low-income customers in single family homes (1-4 units) with comprehensive energy services. The average spending per home was about \$3,600 and the average first-year savings per home was estimated to be about 21.65 Dths.⁴ Important findings include:

- Investment per Unit – The investment per unit appears to be similar among the programs – most fall within the range from \$1,800 per unit to \$3,600 per unit. However, there were important differences in the comprehensiveness of the programs and the way that the programs were funded.
 - Co-Funded with WAP – The CPE Weatherization and MERC Low-Income Weatherization program were co-funded with WAP and could be used for multiple program measures. Those two programs were similar in terms of their cost, as might be expected since they used the same service providers. The GPNG CAP Weatherization program is co-funded, but set cost limits on program services and only had an average cost per unit of \$2,181.
 - Single Funding Source – The MERC 4U2 program delivered comprehensive program services with a single funding source and was required to follow WAP guidelines with respect to measure selection and installation, as well as health and safety protocols. It had the highest average cost per unit. The CPE Rental Efficiency Program also had a single funding source, but the building owner paid 50 percent of the cost of service delivery. After accounting for CPE and building owner costs, the average cost per unit for that program was \$6,534 (in 2015) and was similar to the 4U2 program. The GMG Home Energy Services program spent only \$1,851 per unit indicating that those homes needed fewer services than those in other IOU programs.
 - Mixed Funding Sources – The Xcel HESP program was co-funded in some areas and single source in others. Since the average cost per unit was only \$3,122 and many of its jobs have only HESP funding, the program appears to be lower cost than some other programs.
- First-Year Savings per Unit – The differences in first-year energy savings estimates appear to be consistent with the average spending level per unit. The CPE Weatherization Project spent \$3,482 per unit and reported average first-year savings of 19.23 Dths, compared to the GPNG CAP Weatherization program that spent \$2,181 (about 38 percent less) and reported average

⁴ The CPE Rental Efficiency program was implemented in 2014, but the program did not deliver substantial benefits until 2015. The 2015 program statistics are listed in the table to demonstrate the program potential. The 2015 program accomplishments are not included in the table totals.

savings of 14.84 Dths (about 23 percent less). MERC's reported savings are outliers; the Low-Income Weatherization program reported average savings of 31.78 Dths and the 4U2 program reported average savings of 54.61 Dths. Those savings differences might be possible, but it would be important to get more robust measured energy savings estimates before recommending that other IOUs adopt MERC program practices.

Table 35. Comprehensive Natural Gas Single Family LI CIP Programs

Utility Program	Program Spending	Units	Spending per Unit	First-Year Savings (Dths)	Savings Per Unit
CPE Weatherization	\$1,779,574	511	\$3,482	9,826 ^a	19.23
CPE Rental Efficiency	\$65,996	8	\$8,250	110 ^a	13.75
2015 CPE Rental Efficiency	\$245,043	75	\$3,267	1,619 ^a	21.59
Xcel HESP	\$1,426,747	457	\$3,122	7,263	15.89
MERC Low-Income Weatherization	\$288,493	86	\$3,355	2,733	31.78
MERC 4U2	\$662,259	99	\$6,689	5,406	54.61
GPNG CAP Weatherization	\$41,447	19	\$2,181	282	14.84
GMG Home Energy Services	\$16,662	9	\$1,851	125 ^a	13.44
ALL Comprehensive Single Family ^b	\$4,281,178	1,189	\$3,601	25,745	21.65

a. Reported by CPE/GMG in MCF. Multiplied by 1.032 to convert to Dths.

b. Excludes 2015 CPE Rental Efficiency information.

It also is useful to note that a total of 1,189 housing units were served by these programs, compared to the 1,782 housing units served by the WAP and EAPWX programs. We estimate that about 616 of the LI CIP units were co-funded with WAP (i.e., those units from CPE Weatherization, MERC Low-Income Weatherization, and GPNG CAP Weatherization), while the remaining 573 were from single funding sources (i.e., units from CPE Rental Efficiency, Xcel HESP, MERC 4U2, and GMG Home Energy Services). There is no clear difference in the reported performance of programs that were co-funded compared to those that were single-source funded.

Table 36 shows the way that the natural gas IOUs implemented these programs. In all programs, the IOU paid the service provider for the costs of the installed measures. Some programs—CPE Weatherization, Xcel HESP West, MERC Low-Income Weatherization, GPNG CAP Weatherization, and GMG Home Energy Services—were co-funded with WAP; the IOU pays for the cost of installing individual measures in units that are served by the WAP program. Other programs—MERC 4U2, Xcel HESP East, and GMG Home Energy Services—were implemented without other funding sources. The Rental Efficiency Project was the only program that gets a substantial contribution toward services from the building owner. The other programs followed the WAP protocol in which the local service provider negotiates owner

contributions based on individual circumstances when weatherizing single family homes (1-4 units). Only the Xcel East program was explicitly coordinated with the electric program since Energy Cents delivers both the gas program and the electric program for Xcel.

**Table 36. Comprehensive Natural Gas Single Family LI CIP Program
Targeting, Design, and Implementation**

Utility Program	Intake Source	Service Provider(s)	Coordination with Electric Programs	Coordination with WAP/EAP	Program Incentives
CPE Weatherization	WAP	SRC / WAP service providers	Yes	Yes	Pays service provider for cost of installed measures
CPE Rental Efficiency	Energy Cents	Energy Cents	No	No	Building owner pays 50% of costs
Xcel HESP West	WAP	SRC / WAP service providers	Yes	Yes	Pays service provider for cost of installed measures
Xcel HESP East	Xcel Electric and Gas Affordability Programs	Energy Cents	Yes	No	Pays service provider for cost of installed measures
MERC Low-Income Weatherization	WAP	SRC / WAP service providers	Yes	Yes	Pays service provider for cost of installed measures
MERC 4U2	MERC Franklin Energy WAP	Franklin Energy	No	Over income referrals	Pays service provider for cost of installed measures
GPNG CAP Weatherization	WAP	WAP service providers	Yes	Yes	Pays service provider for cost of installed measures

Utility Program	Intake Source	Service Provider(s)	Coordination with Electric Programs	Coordination with WAP/EAP	Program Incentives
GMG Home Energy Services	GMG / NEC	NEC	No	Yes	Pays service provider for cost of installed measures

Table 37 shows the measures that are eligible for installation for each program.

- Weatherization Measures - In all cases, the programs paid the service provider for installation of the weatherization measures. In the Rental Efficiency Project, the building owner paid the service provider for 50 percent of the cost of the measures.
- Heating Equipment – In all cases, the programs paid the service provider for replacement of heating equipment. In some programs, heating system replacement was an energy efficiency measure. In others, the utility paid for nonworking or unsafe heating and water heating equipment as a health and safety measure.
- Behavioral Measures – In most programs, the IOU would pay for the installation of setback thermostats and water efficiency measures. In the MERC and GPNG programs it appears that the IOU expected the WAP program to pay for those measures.
- Among the programs listed, the only direct mention of ventilation health and safety measures was for the Xcel HESP program. However, all of the other programs use WAP service delivery protocols that would require either the program (e.g., MERC 4U2) or WAP to pay for ensuring that the home meets appropriate ventilation requirements.

Table 37. Comprehensive Natural Gas Single Family LI CIP Eligible Measures

Utility Program	Weatherization	Heating Equipment Repair and Replacement	Behavioral Measures	Health and Safety Measures
CPE Weatherization	Yes	No	Yes	Yes
CPE Rental Efficiency	Yes	Yes	Yes	No
Xcel HESP	Yes	Yes	Yes	Yes
MERC Low-Income Weatherization	Yes	No	No	Yes
MERC 4U2	Yes	No	Yes	Yes
GPNG CAP Weatherization	Yes	No	No	Separate Program
GMG Home Energy Services	Yes	Yes	Yes	Yes

4.6.2 Other IOU LI CIP Programs

Our analytic framework has two important dimensions that facilitate comparison of programs, housing unit type (i.e., single family vs. multifamily) and service delivery type (i.e., comprehensive, low-cost direct install, and measure rebate). There are relatively few of each type of program other than the single family comprehensive programs.

Table 38 shows that the natural gas IOUs invested \$754,886 to serve 4,628 low-income housing units with other low-income energy programs. Over 60 percent of the funds were invested in single family direct install programs and over 20 percent was invested in single family measure rebate programs. Only about 15 percent of other funds were invested in multifamily buildings.

- The two programs that delivered higher value services—GPNG Furnace Replacement and CPE Non-Profit Affordable Housing—cost about as much per unit and delivered similar savings to the comprehensive single family programs.
- The multifamily program delivers services to a large number of customers while only serving a relatively small number of buildings.
- The LI HES program appears to deliver a significant amount of first-year savings for a relatively low cost.

It is useful to note that each of these programs is only delivered by one IOU. They represent good examples of programs that other IOUs might consider adopting.

Table 38. Other Natural Gas LI CIP Programs

Utility Program	Program Spending	Units	Spending per Unit	First-Year Savings (Dths)	Savings Per Unit
<i>Single Family Direct Install</i>					
CPE Heating System Tune-Ups	\$79,283	751	\$105	1,395 ^a	1.86
Xcel Home Energy Squad	\$364,713	1,466	\$249	12,413	8.47
GPNG Furnace Replacement	\$28,350	8	\$3,544	279	34.88
GPNG Furnace Tune-Up	\$108	1	\$108	NR	NR
<i>Single Family Measure Rebates</i>					
CPE Non-Profit Affordable Housing	\$163,593	75	\$2,181	1,900 ^a	25.33
<i>Multifamily Measure Rebates</i>					
CPE Multifamily Building	\$118,839	2,327	\$51	9,458 ^a	4.06
<i>All Other Programs</i>					
ALL Other Programs	\$754,886	4,628	\$163	25,445	5.50

a. Reported by CPE in MCF. Multiplied by 1.032 to convert to Dths.

NR = Not Reported

It is important to note that MERC serves low-income multifamily buildings in a business-segment program that is not counted in its low-income segment. It also is important to mention that CPE and Xcel have designed and begun to implement a comprehensive multifamily program that is designed to work with multifamily building owners who want to make a more significant investment in the energy efficiency of their buildings. Those programs are in the business segment for both CPE's and Xcel's CIP portfolios.

Table 39 shows the way that the natural gas IOUs implemented these programs. CPE had the largest number of these other programs. CPE managed the programs with their own staff. The GPNG programs were integrated with their weatherization program. The Xcel program served a large number of housing units with direct install measures.

Table 39. Other Natural Gas LI CIP Program Targeting, Design, and Implementation

Utility Program	Intake Source	Service Provider(s)	Coordination with Electric Programs	Coordination with WAP/EAP	Program Incentives
<i>Single Family Direct Install</i>					
CPE Heating System Tune-Ups	CPE	CPE	N/A	No	Pays service provider for cost of installed measures
Xcel Low-Income Home Energy Squad	Xcel	NEC	Yes	No	Pays service provider for cost of installed measures
GPNG Furnace Replacement	WAP	WAP service providers	N/A	Yes	Pays service provider for cost of installed measures to a limit
GPNG Furnace Tune-Up	WAP	WAP service providers	N/A	Yes	Pays service provider for cost of installed measures to a limit
<i>Single Family Measure Rebates</i>					
CPE Non-Profit Affordable Housing	CPE	CPE	No	No	Pays organization for incremental cost of efficient equipment
<i>Multifamily Measure Rebates</i>					
CPE Multifamily Building	CPE	CPE	No	No	Pays incremental cost of efficient equipment

Table 40 shows the measures that were eligible for installation for each program. The CPE Non-Profit Affordable Housing Program gave the nonprofit organization the opportunity to select from a comprehensive set of energy efficiency measures. The major difference from the comprehensive single family homes discussed previously was that those programs require the service delivery organization to install all cost-effective measures, while this program allowed the organization to decide what measures to install. The other programs paid for a more limited set of measures.

Table 40. Other Natural Gas LI CIP Program Eligible Measures

Utility Program	Weatherization	Heating Equipment Repair and Replacement	Behavioral Measures	Health and Safety Measures
<i>Single Family Direct Install</i>				
CPE Heating System Tune-Ups	No	Yes	No	No
Xcel Low-Income Home Energy Squad	Limited	No	Yes	No
GPNG Furnace Replacement	No	No	No	Heating Equipment
GPNG Furnace Tune-Up	No	Yes	No	No
<i>Single Family Measure Rebate</i>				
CPE Non-Profit Affordable Housing	Yes	Yes	Yes	No
<i>Multifamily Measure Rebate</i>				
CPE Multifamily Building	No	Yes	No	No

4.6.3 Summary of Findings

The analysis of the natural gas IOU programs shows that about 85 percent of the LI CIP spending was used for comprehensive programs that served single family homes. Important findings related to those programs include:

- **Program Implementer** – Some IOU programs contracted with WAP service providers to deliver their LI CIP program services and, in most cases, the program paid for a subset of the measures delivered to housing units that are also served with WAP and/or EAP/WX funds. Other IOU programs contracted with other nonprofit organizations and for-profit contractors to deliver all program services to housing units.
- **Incentives** – For all these programs, the IOU paid the service delivery contractor for the cost of delivering the services. The customer often does not get to choose which measures are installed; rather the contractor installs all measures that meet the program guidelines. [Note: The 4U2 program allows the homeowner to pay for measures that would not be installed according to the program guidelines.]
- **Health and Safety Measures** – It does not appear that the programs were consistent with respect to what health and safety measures are installed or what limits were placed on health and safety spending.

Only about 15 percent of LI CIP spending was used for other types of LI CIP programs. In most cases, only one of the IOUs had implemented the program. For example, Xcel is the only IOU that had implemented a low cost direct install program for single family homes. CPE was the only IOU that implemented a measure rebate program for nonprofit affordable housing organizations. The key finding from the analysis of these programs is that each should be reviewed and considered by other IOUs because they often serve other segments of the low-income population in a different way.

5.0 Electric IOU Low-Income Programs

The three electric IOUs are required to spend 0.2 percent of their three-year average residential gross operating revenues on low-income programs. The statute defines low-income programs as "energy conservation improvement programs that directly serve the needs of low-income persons, including low-income renters." This section of the report furnishes detailed information on the programs implemented by each electric IOU to meet this requirement.

The electric IOUs and their 2014 spending requirements were:

- Xcel Energy (Xcel) - \$1,902,024
- Minnesota Power (MNP) - \$198,816
- Otter Tail Power (OTP) - \$97,671

This section of the report also compares the characteristics and performance of the programs implemented by all the electric IOUs.

5.1 Xcel Electric LI CIP Programs

The Xcel electric LI CIP programs included:

- Home Energy Savings Program (HESP) – Delivered comprehensive services to owner-occupied and rental single family homes (buildings with one unit).
- Low-Income Home Energy Squad Program (LI-HES) – Delivered low-cost measures to single family homes (buildings with one unit).
- Multi-Family Energy Savings Program (MESP) – Delivered energy efficiency measures to renters in multifamily buildings (buildings with two or more units).

Table 41. Xcel Electric LI CIP Program Summary - 2014

Program Name	Building Type	Program Type	Actual Spending	Units	Spending per Unit
HESP	Single Family	Comprehensive	\$1,120,679	2,098	\$534
LI-HES	Single Family	Direct Install	\$295,201	1,430	\$206
MESP	Multifamily	Direct Install ^b	\$806,748	2,238	\$360
TOTAL	Mixed	Mixed	\$2,222,628	5,766 ^a	\$385

- Sometimes a household who receives HES services will be referred to HESP. It is possible that the total housing units served is less than 5,766 separate jobs if there is duplication between the two programs.
- MESP is labeled as direct install because it is comprehensive only from the perspective of the individual apartment, not from the perspective of the building.

Table 41 furnishes summary information about each of the programs. HESP received about 50 percent of the spending, LI-HES received about 13 percent, and MESP received about 36 percent. Together, the programs served almost 6,000 Xcel low-income electric customers.

As it was for the IOU natural gas programs, LI-HES is unique among electric IOU programs and might be considered by other electric IOUs. MESP also is unique, but might be less applicable for other electric IOUs that have more rural service territory and may have fewer multifamily buildings.

Table 42. Xcel Electric LI CIP Program Targeting, Design, and Implementation

Program Name	Intake Source	Service Provider(s)	Coordination with Gas Programs	Coordination with WAP/EAP	Program Incentives
HESP West	WAP	SRC	Yes	Yes	Pays service provider for cost of installed measures
HESP East	Xcel Energy Assistance Programs	Energy Cents	Yes	No	Pays service provider for cost of installed measures
LI-HES	Xcel / NEC	NEC	Yes	Yes	Pays service provider for cost of installed measures
MESP	LIRC ⁵	Franklin Energy	No	No	Pays service provider for cost of installed measures

Table 42 furnishes detailed information about the implementation of each Xcel electric LI CIP program. Some points of interest include:

- **Program Implementer** – SRC administered HESP in the western metropolitan area and outstate regions (HESP West). Energy Cents administered the program in the eastern metropolitan area (HESP East). NEC, a nonprofit organization, administered LI-HES. Franklin Energy, a for-profit company, implements MESP.
- **Program Coordination** – Where HESP was administered by SRC it was coordinated with WAP, but where it was administered by Energy Cents it was not coordinated with WAP. LI-HES made referrals to HESP when it determined that the home needs more comprehensive services. Both HESP and LI-HES were coordinated with natural gas service delivery in the east metropolitan region since both the electric and gas programs were delivered by the same contactor. In the west metropolitan region, HESP was coordinated with natural gas programs by the WAP service providers. Since CPE had a residential segment HES program, it is possible that the service

⁵The Low Income Rental Certification (LIRC) list furnishes information on the eligibility of a building for lower property tax rates.

provider coordinated natural gas and electric service delivery for low-income housing units. However, that is not clear from the program Plans. The MESP program was not coordinated with other programs.

- Program Incentives – For all programs, the Xcel program paid the service provider directly for the cost of the measures and the service delivery.

The main differences in the HESP and LI-HES programs were the recruitment/intake procedures and the comprehensiveness of the measures. The MESP program had the extra cost of engaging the building owner, but had the advantage of serving many housing units at one location.

The information on payments by building owners for delivery of measures to rental units is not clear. HESP West was delivered using WAP guidelines which would require the service provider to work with the building owner to determine the owner contribution amount. It is expected that HESP East used the same protocol. There was no information in Xcel's plan that indicated whether building owners needed to contribute to the cost of LI-HES or MESP.

One important issue identified in the review of the 2017-2019 Triennial Plan is that Xcel proposed to expand the HESP program to include small multifamily buildings (i.e. buildings with 2 to 4 housing units) and the Department asked questions about the procedures for determining the amount that building owners would need to contribute to program services. In 2014, the program only served single family homes that were in buildings with one housing unit. While there was no information about building owner contributions in the 2013-2015 plan, we assume that the program followed the WAP protocol and allowed the local service delivery agency to negotiate with the building owner. However, in their review of the 2017-2019 Triennial Plan filing, the Department suggested that Xcel should require that all building owners make a specific contribution to the cost of energy efficiency measures. The final Commissioner's decision ordered Xcel to require building owners to pay for 50 percent of the cost of measures when the building owner pays for the cost of the fuel used by the installed measure or equipment.

Table 43 furnishes information on electric efficiency measures that were eligible for each program. HESP had separate audit and measure installation visits, and a comprehensive set of energy efficiency measures. LI-HES delivered all services in one visit and a more limited set of measures. MESP delivered most services in one visit, but scheduled refrigerators and air conditioners to be installed after the visit. The Xcel HESP program delivered weatherization measures to housing units that heat with electricity; it had not taken advantage of the Department guidance that allows them to deliver services to customers with delivered fuel main heat.

An electric IOU has opportunities to install more types of energy-efficient equipment to install than does a natural gas IOU. However, unless the IOU serves households that use a delivered fuel as their primary heating fuel, the average investment per home from a comprehensive program for an electric IOU is generally less than the average investment for a gas IOU. The average investment per housing unit for the Xcel natural gas HESP was \$3,122, compared to the average investment of \$534 for the electric HESP.

Table 43. Xcel Electric LI CIP Program Measures

Eligible Measures	HESP	LI-HES	MESP
Weatherization Measures	Yes	Limited	No
Heating/Water Heating Equipment	No	No	No
ECM Furnace Fan	Yes	No	No
Refrigerators/Freezers	Yes	No	Yes
Window/Wall Air Conditioner	Yes	No	Yes
Lighting	Yes	Yes	Yes
Distribution System Measures	No	Yes	No
Behavioral Measures	No	Yes	No
Health and Safety Equipment	No	No	No
Health and Safety Ventilation	Yes	No	No

Table 44. Xcel Electric LI CIP Program Accomplishments

Program Name	Actual Spending	Units	First-Year Energy Savings (kWh)	Savings per Unit (KWh)	Utility Cost per kWh Saved (First-Year)	Utility Cost Test	Societal Cost Test
HESP	\$1,120,679	2,098	918,234	438	\$1.22	0.47	0.68
LI-HES	\$295,201	1,430	1,008,187	705	\$0.29	2.62	2.30
MESP	\$806,748	2,238	1,026,922	460	\$0.79	0.67	0.79
TOTAL	\$2,222,627	5,766	2,953,342	512	\$0.75	0.83	0.88

Table 44 furnishes information on Xcel-reported program accomplishments, including estimated first-year energy savings, average first-year savings per unit, and the cost per first-year Dth saved. Some important findings include:

- First-Year Savings per Unit – The savings per unit were highest for LI-HES. Even though the program delivers a more limited set of services, it delivers each of those services to a higher percentage of housing units.
- Cost per First-Year Savings – LI-HES had the lowest cost per kWh of first-year savings; it is projected to deliver higher first-year savings at a lower cost than either HESP or MESP.

- **Cost Effectiveness** – The societal cost test shows that LI-HES was projected to be cost-effective, while HESP and MESP were not. The difference in the cost-effectiveness ratios is not as great as the difference in the cost per first-year savings estimate. HESP and MESP delivered savings that have a longer average measure life than LI-HES.

However, these differences in performance are less compelling than they might be if the energy savings values were validated through program evaluations that measure savings using billing data analysis.

5.2 Minnesota Power LI CIP Programs

In 2014, Minnesota Power delivered a single comprehensive LI CIP program to low-income customers that included energy education, energy analysis, direct installation of low-cost measures, and replacement of appliances and equipment. Table 45 furnishes summary information on the program. It program treated both single family and multifamily homes. The program delivered 13,008 measures. The Plan and Status Report did not indicate how many customers were served by the program.

Table 45. – MNP Electric LI CIP Program Summary - 2014

Program Name	Building Type	Program Type	Actual Spending	Measures ^a	Spending per Measure
Energy Partners	Single Family and Multifamily	Comprehensive	\$565,405	13,008	\$43

a. Minnesota Power reports total measures, not housing units.

Table 46 furnishes detailed information about the implementation of the Energy Partners program.

- **Program Implementer** – Minnesota Power worked with seven WAP service providers to deliver the Energy Partners program.
- **Program Coordination** – The program coordinated with WAP by contracting with WAP service providers who could combine WAP funds, CIP gas program funds from other utilities (if available), and MNP CIP funds.
- **Incentives** – The program paid for the costs of the measures and the service delivery.

The program Status Report indicated that the program targeted households with high electric usage. It did not furnish information on how that was accomplished. However, it is likely that target households were identified using the EAP eHeat database.

Since the program was implemented by WAP service providers, it is expected that it serves both owners and renters, and that the individual service providers worked with building owners to determine the appropriate level of building owner contributions toward the cost of service delivery.

Table 46. MNP Electric LI CIP Program Targeting, Design, and Implementation

Program Name	Intake Source	Service Provider(s)	Coordination with Gas Programs	Coordination with WAP/EAP	Program Incentives
Energy Partners	WAP	WAP Service Providers	Yes	Yes	Pays service provider for cost of installed measures

Table 47 furnishes information on electric efficiency measures that were eligible for the program. The program information sheet in Status Report indicates that all types of residential measures were available. However, it only reported savings for the measures listed below. Savings were reported for water heater replacement, water measures, refrigerators, freezers, CFLs, power strips, and other measures. No savings were reported for building shell measures.

Table 47. MNP Electric LI CIP Program Measures

Eligible Measures	Energy Partners
Weatherization Measures	Yes ^a
Heating/Water Heating Equipment	Yes ^b
ECM Furnace Fan	Yes*
Refrigerators/Freezers	Yes
Window/Wall Air Conditioner	No
Lighting	Yes
Distribution System Measures	No
Behavioral Measures	Yes
Health and Safety Equipment	No
Health and Safety Ventilation	No

a. Reported as eligible measures, but no savings claimed for 2014.

b. Made available for 2014 but no WAP service providers delivered this service.

Table 48 furnished information on Minnesota Power's reported program accomplishments. Some important findings include:

- First-Year Savings per Unit – Since Minnesota Power reported on savings per measure rather than savings per unit, it is difficult to tell how the program is impacting individual customers. For example, if the 13,000 measures were delivered to 1,000 Minnesota Power customers, the first-

year energy savings would be about 1,560 kWh per customer (120 per measure * 13 measures per customer).

- Cost per First-Year Savings and Cost-Effectiveness – The cost per unit of first-year savings was relatively low and, as a result, the societal cost test suggests that this program was cost-effective.

However, these findings for program performance are less compelling than they might be if the energy savings values were validated through program evaluations that measure savings using billing data analysis.

Table 48. MNP Electric LI CIP Program Accomplishments

Program Name	Actual Spending	Measures ^a	First-Year Energy Savings (kWh)	Savings per Measure (KWh)	Utility Cost per kWh Saved (First-Year)	Utility Cost Test	Societal Cost Test
Energy Partners	\$565,405	13,008	1,555,355	120	\$0.36	0.80	1.97

a. Minnesota Power reports measures, not housing units.

5.3 Otter Tail Power LI CIP Programs

In 2014, Otter Tail Power delivered a comprehensive LI CIP program to low-income customers that included energy analysis, direct installation of low-cost measures, replacement of equipment and appliances, and building shell measures. Table 49 furnishes summary information on the program. The program delivered energy efficiency measures to 100 low-income customers. The program was available to rental units, but only one rental unit participated in 2014.

Table 49. OTP Electric LI CIP Program Summary - 2014

Program Name	Building Type	Program Type	Actual Spending	Units	Spending per Unit
House Therapy	Single Family	Comprehensive	\$142,588	100	\$1,426

Table 50 furnishes detailed information about the implementation of the House Therapy program. The program coordinated with WAP by contracting with WAP service providers. WAP service providers can combine WAP funds, natural gas CIP program funds, and OTP CIP funds. The program paid the service provider for the costs of the measures and the service delivery. It is assumed that the service providers follow WAP protocols and work with building owners to determine the appropriate level of contribution for program services.

Table 50. OTP Electric LI CIP Program Targeting, Design, and Implementation

Program Name	Intake Source	Service Provider(s)	Coordination with Gas Programs	Coordination with WAP/EAP	Program Incentives
House Therapy	WAP	WAP Service Providers	Yes	Yes	Pays service provider for cost of installed measures

Table 51 furnishes information on electric efficiency measures that were eligible for the program. The program pays for weatherization measures for housing units with electricity as their primary heating fuel, water heating equipment, CFLs, and a number of different types of appliances.

Table 51. OTP Electric LI Program Measures

Eligible Measures	Energy Partners
Weatherization Measures	Yes
Heating/Water Heating Equipment	No
ECM Furnace Fan	No
Refrigerators/Freezers	Yes
Window/Wall Air Conditioner	No
Lighting	Yes
Distribution System Measures	Yes
Behavioral Measures	Yes
Health and Safety Equipment	No
Health and Safety Ventilation	No

Table 52 furnishes information on Otter Tail Power's reported program accomplishments. Some important findings include:

- First-Year Savings per Unit – The estimated savings per customer are substantial; on average each home is projected to save over 2,000 kWh in the first year.
- Cost per First-Year Savings and Cost-Effectiveness – The cost per unit of first-year savings is relatively low and, as a result, the societal cost test suggests that this program is highly cost-effective.

However, these findings for program performance are less compelling than they might be if the energy savings values were validated through program evaluations that measure savings using billing data analysis.

Table 52. OTP Electric LI CIP Program Accomplishments

Program Name	Actual Spending	Units	First-Year Energy Savings (kWh)	Savings per Unit (KWh)	Utility Cost per kWh Saved (First-Year)	Utility Cost Test	Societal Cost Test
House Therapy	\$142,588	100	204,930	2,049	\$0.70	1.02	9.01

5.4 Summary Information on IOU Electric LI CIP Programs

Table 53 shows that the electric IOU LI CIP programs invested a substantial amount of funding in LI CIP programs in 2014- almost \$3 million in spending that reached almost 6,000 low-income households. However, the number of LI CIP housing units and the average spending per housing unit varied considerably among the utilities and by program.

Table 53. 2014 Electric LI CIP Program Summary

Utility	Building Type(s)	Program Type(s)	Program Spending	Units	Spending per Unit
Xcel Energy	Mixed	Mixed	\$2,222,627	5,766	\$385
Minnesota Power	Mixed	Comprehensive	\$565,405	NR	NR
Otter Tail Power	Single Family	Comprehensive	\$142,588	100	\$1,426
All Programs	Mixed	Mixed	\$2,930,620	NA	NA

NR = Not Reported / NA = Not available

5.4.1 Comprehensive Single Family Programs

Table 54 shows that the electric IOUs invested about \$1.8 million to serve over 2,000 low-income customers in single family homes (1-4 units) with comprehensive energy services, a little over 60 percent of total electric IOU spending. The average spending per home was about \$574 and the average first-year savings per home was estimated to be about 511 kWh. Important findings include:

- Investment per Unit – The investment per unit was much higher for the Minnesota Power and Otter Tail Power programs than for the Xcel program. Otter Tail spent \$1,426 per unit and it is

likely that Minnesota Power also spent over \$1,000 per home, compared to average spending of \$534 per unit for Xcel HESP.

- **First-Year Savings per Unit** – The first-year savings values are difficult to interpret. The Minnesota Power program spent less than one-half the amount spend by the Xcel HESP program, but reported first-year savings more than 50 percent higher. Similarly, the Otter Tail Power program spending per unit was about 2.5 times that of Xcel’s HESP, but the average savings were more than 4 times higher.

Since the programs appear to offer similar measures installed by the same type of provider, it would be important to work towards more complete validation of these savings to document the source of the differences.

Table 54. Comprehensive Electric Single Family LI CIP Programs

Utility	Program Spending	Units	Spending per Unit	First-Year Savings (kWh)	Savings Per Unit
Xcel HESP	\$1,120,679	2,098	\$534	918,234	438
MNP Energy Partners	\$565,405	13,008 ^a	\$43	1,555,355	120*
Otter Tail Power	\$142,588	100	\$1,426	204,930	2,049
All Programs	\$1,828,672	2,198	\$574 ^a	2,678,519	511 ^a

a. Excludes Minnesota Power which reported measures rather than units

Table 55 shows the way that the electric IOUs implemented these programs. All paid for the costs of service delivery. The Xcel HEAP East program was delivered separately from WAP, while the other programs were co-funded with WAP. Only the Xcel program was explicitly coordinated with the gas program.

**Table 55. Comprehensive Electric Single Family LI CIP Program
Targeting, Design, and Implementation**

Utility	Intake Source	Service Provider(s)	Coordination with Gas Programs	Coordination with WAP/EAP	Program Incentives
Xcel HESP West	WAP	SRC / WAP service providers	Yes	Yes	Pays service provider for cost of installed measures
Xcel HESP East	Xcel Affordability programs	Energy Cents	Yes	No	Pays service provider for cost of installed measures
MNP Energy Partners	WAP	WAP Service Providers	Yes	Yes	Pays service provider for cost of installed measures
OTP House Therapy	WAP	WAP Service Providers	Yes	Yes	Pays service provider for cost of installed measures

Table 56 the measures that are eligible for installation for each program. These programs tend to invest the most funds in lighting and appliances, as well as water heating measures for homes with electric water heat.

Table 56. Comprehensive Electric Single Family LI CIP Eligible Measures

Utility	Weatherization	Equipment Repair and Replacement	ECM Motors	Lighting and Appliances	Behavioral Measures
Xcel HESP	Yes	No	Yes	Yes	No
MNP Energy Partners	Yes*	Yes*	Yes*	Yes	Yes
OTP House Therapy	Yes	No	No	Yes	Yes

a. Listed as eligible measure, but no savings reported

5.4.2 Other Programs

Table 57 shows that the Xcel invested about \$1.1 million to serve 3,668 low-income housing units with other types of energy services. That was about 50 percent of Xcel's electric program spending and represents about 40 percent of all electric IOU spending. These programs differed from the comprehensive energy services by delivering a more limited set of program measures and treating different kinds of buildings. The Xcel LI-HES is categorized as a single family direct install program. The Xcel MESP is categorized as multifamily direct install program. Neither of the other electric IOUs implemented either of these types of programs. None of the electric IOUs implemented a single family measure rebate program, a multifamily measure rebate program, or a multifamily comprehensive program in their LI CIP segment. Xcel offers a multifamily comprehensive program in its business segment.

Table 57. Other Electric LI CIP Programs

Utility	Program Spending	Units	Spending per Unit	First-Year Savings (kWh)	Savings Per Unit
<i>Single Family Direct Install</i>					
Xcel LI-HES	\$295,201	1,430	\$206	1,008,187	705
<i>Multifamily Direct Install</i>					
Xcel MESP	\$806,748	2,238	\$360	1,026,922	460
<i>All Other Programs</i>					
All Other Programs	\$1,101,949	3,668	\$302	2,035,109	555

Table 58 shows the way that the Xcel IOUs implemented these programs. Both programs had third-party implementers: NEC and Franklin Energy. The LI-HES was coordinated with IOU gas programs in the regions where Xcel electric and gas service territories overlap. Neither of these programs was coordinated with EAP or WAP.

Table 58. Other Electric LI CIP Program Targeting, Design, and Implementation

Utility	Intake Source	Service Provider(s)	Coordination with Gas Programs	Coordination with WAP/EAP	Program Incentives
Xcel LI-HES	Xcel / NEC	NEC	Yes	No	Pays service provider for cost of installed measures
Xcel MESP	Xcel / LIRC	Franklin Energy	No	No	Pays service provider for cost of installed measures

Table 59 shows the measures that were eligible for installation for each program. Each program paid for limited set of measures.

Table 59. Other Electric LI CIP Program Eligible Measures

Utility	Weatherization	Equipment Repair and Replacement	ECM Motors	Lighting and Appliances	Behavioral Measures
Xcel LI-HES	Limited	No	No	Yes	Yes
Xcel MESP	No	No	No	Yes	Yes

5.6.3 Summary of Findings

The analysis of the electric IOU programs shows that about 60 percent of the LI CIP spending was used for comprehensive programs that serve single family homes while 40 percent was used for other types of programs.

Important findings related to those comprehensive single family home programs include:

- Spending per Housing Unit – The average spending per housing unit was much higher for the Minnesota Power and Otter Tail programs than for the Xcel program.
- First-Year Savings per Housing Unit – The report first-year savings per housing unit were much higher for the Minnesota Power and Otter Tail programs than for the Xcel program.
- Program Implementer – The Otter Tail and Minnesota Power programs were implemented by WAP service providers. The Xcel programs were implemented by WAP service providers in the western metropolitan region and outlying areas, and by Energy Cents in the eastern metropolitan region. The jobs completed by WAP service delivery agencies can be co-funded with WAP jobs and with natural gas jobs. We do not have information on the distribution of co-funded jobs vs. jobs that are delivered with a single funding source.
- Incentives – For all these programs, the IOU paid the service delivery contractor for the cost of delivering the services.
- Health and Safety Measures – The Minnesota Power program offered to pay for the installation of heating equipment for delivered fuel customers with nonworking furnaces. However, none of the WAP services providers took advantage of that opportunity in 2014.

About 40 percent of electric IOU spending were used to deliver other types of energy efficiency services. Xcel implemented the LI-HES and MESP programs. Each of these programs served a relatively large number of low-income customers with savings that were higher than those estimated for the Xcel HESP, but were lower than those estimated for the comprehensive programs implemented by Minnesota Power and Otter Tail Power.

6.0 Assessment Framework

The purpose of this study is to conduct a comprehensive assessment of the Conservation Improvement Program (CIP) services delivered to low-income households by Minnesota’s investor-owned utilities (IOUs) with the goal of helping the Department and the IOUs to identify ways to increase the efficiency and effectiveness of those programs.

We believe that the Department and the IOUs are best served if we use a three-level assessment framework to conduct our analysis and present our findings. The framework involves making the following assessments:

- **Explicit Program Requirements** – The statute and the Department have established explicit program requirements that identify the objectives that an IOU is required to meet and guidance that tells IOUs what they are allowed to do in terms of designing, implementing, and reporting on their low-income programs. We first establish whether the individual IOUs have met the regulatory requirements and then document whether they have taken advantage of program guidance that is intended to improve the effectiveness of their programs.
- **Implicit Program Objectives** – The Statute, Rules, and Commissioner Decisions and Orders do not always furnish explicit guidance on the objectives of the low-income program. However, where there is consistent reference to certain program outcomes, we perceive that it is appropriate to consider those to be implicit program objectives against which the performance of the set of IOU programs can be assessed.
- **Low-Income Program Best Practices** – Our experience with low-income program research and evaluation at the national level and in other jurisdictions has helped us to identify low-income program best practices that have been shown to deliver the most effective and efficient program services to low-income households. The third part of our assessment examines whether the Minnesota IOU low-income programs have adopted those best practices.

The natural gas and electric IOUs have implemented low-income programs that are designed to meet the explicit statutory and regulatory requirements established by the legislature and the Department. Our research also has shown that, in the process of identifying ways to better serve their low-income customers and in the context of meeting other CIP requirements, the IOUs have developed innovative programs that go beyond the basic requirements to deliver efficient and effective energy services to low-income customers. In this assessment, we document how the IOUs have met the basic requirement, what program initiatives have helped them to go beyond those basics, and what opportunities there are for the IOU programs deliver efficient and effective services to low-income customers.

6.1 Explicit Program Requirements

The different elements of the regulatory framework come together to define the policies and procedures that the Department has established to ensure that utilities fulfill the statutory

requirements with respect to the low-income spending requirement. Those policies and procedures include:

- Low Income Spending Requirement Amount - Each year, electric and gas utilities and associations are required to spend a specified percentage of their three-year average residential gross operating revenue (GOR) on low-income programs.
- Qualified Low-Income Spending - IOUs are required to spend the specified amount on programs that "directly address the needs of low-income persons, including low-income renters." The Department perceives that IOUs are required to meet the spending requirements with spending on programs that were approved for inclusion in the utility's low-income program segment.
- Planning and Reporting Requirements - IOUs are required to file a prospective Triennial Plan, part of which identifies their proposed low-income programs and documents how they plan to meet the low-income spending requirements. IOUs also are required to file Annual Status Reports, part of which lists their actual spending on low-income programs and demonstrates how spending compared to their low-income spending requirement.
- Compliance - Department staff review all IOU Plans and Status Reports for compliance with low-income program guidelines and the low-income spending requirements, and publish a Decision summarizing the Commissioner's findings.

To ensure that the utilities meet the CIP low-income spending requirement, the Department defines required spending amounts, furnishes guidelines on programs that can be counted toward the spending requirement, reviews Plans and Status Reports for compliance, and issues findings related to compliance. These policies and procedures have been successful in ensuring that the IOUs comply with the CIP low-income program spending requirements with programs that are targeted to address the needs of low-income persons.

Our assessment of whether an IOU meets the explicit program requirements includes the following analyses:

- Spending Requirement – Did the IOU spend the required amount on low-income programs during the analysis year? Does the IOU have effective plans for spending the required amount during subsequent program years?
- Reporting Requirement – Did the IOU file all the required Plans and Reports with all the required information?

In addition to these program requirements, the Department also has issued guidance on two issues that make it easier for utilities to meet their low-income program spending requirement.

- Multifamily Buildings – The Department has issued guidance on multifamily buildings that assists utilities in three ways. First, it furnishes a clear definition of a low-income multifamily building. Second, it identifies existing resources that allow a utility to determine whether a multifamily building is low-income without collecting income information from all building tenants. Third, it

allows the utility program to serve all tenants in a low-income building with in-unit energy efficiency measures, not just those that are certified to be low-income.

- Delivered Fuel Households – The Department has issued guidance for electric utilities that allows them to deliver energy efficiency services to households that use a delivered fuel or natural gas from an exempted utility for space heating or water heating. That guidance gives electric utilities additional opportunities to serve their low-income customers if they are having difficulty meeting spending requirements in other ways.

Our assessment also documents whether the IOUs have taken advantage of this Department guidance.

6.2 Implicit Program Objectives

There are several ways in which the Statute, the Rules, and Commissioner Orders and Decisions have established program objectives that are not clearly defined as program requirements. These include:

- Low-Income Renters – The Statute defines low-income programs as those that “directly serve the needs of low-income persons, including low-income renters.” The Rules require that IOUs report on the number of renters served by IOU programs. The implication is that the IOUs and the Department should be working toward an objective of ensuring that the IOU low-income programs server renters.
- WAP Protocols – The state WAP program office has developed detailed procedures for assessment of the health and safety status of a housing unit, selection and installation of energy efficiency measures, and ensuring quality control for work completed on low-income housing units. In at least one utility filing, the Commissioner ordered the for-profit implementation contractor to follow WAP protocols. In guidance documents issued for COUs, the Department has recommended that COUs work with their local WAP service provider as one way of delivering services to their low-income customers. The implication is that the Department considers those protocols to be a standard against which single family comprehensive programs should be compared.

For purposes of this analysis, we assess each IOUs low-income programs from the following perspectives:

- Renters – What percent of low-income program funds are used to deliver services to low-income renters? Table 9 shows that 57 percent of low-income households are renters. How does the funding allocated to serving renters compare to the share of low-income households in Minnesota that are renters?
- WAP Protocols – To what extent have the IOU low-income programs implemented protocols that are consistent with the WAP protocols?
 - Health and Safety Protocols – Does the program have procedures to assess the health and safety status of the housing unit and to ensure that installed measures do not adversely affect that status?

- Quality Control Protocols – Does the program have quality control protocols that are consistent with those implemented by WAP? Does the IOU take responsibility for ensuring that those protocols are implemented?
- Measure Selection and Installation – Has the IOU considered whether the WAP measure selection and installation protocols are appropriate for their low-income programs? If they are, has the IOU taken responsibility for ensuring that those protocols are met? If not, has the IOU made it clear to the service provider that a different measure selection and/or installation procedure should be implemented?

Since the IOUs have not been directed by the Department to assess their own programs based on these parameters, it is not appropriate to hold the IOUs accountable for failing to meet one or more of these objectives. Rather, it is the intent of this assessment to determine whether the IOUs, in the context of designing and implementing low-income programs have addressed some of these implicit program objectives.

6.3 Low-Income Program Best Practices

WAP is the largest low-income energy efficiency program in the country. The U.S. Department of Energy (DOE) furnishes grants to states and territories to implement programs that meet a common set of standards that are established by DOE. National evaluations of WAP were conducted for program years 2008 and for 2010. Those evaluations identified some best practices for comprehensive single family and multifamily programs.

In many different states, program evaluation research is conducted periodically by WAP grantees and ratepayer-funded programs. Examples include:

- WAP Programs – The WAP programs in Iowa, Illinois, and Wisconsin regularly fund evaluation research to measure the program outcomes.
- Ratepayer Programs – The Pennsylvania PSC requires each IOU to conduct an evaluation of their low-income energy efficiency programs each year. The New Jersey utilities have conducted periodic evaluations of their statewide Comfort Partners program. NYSEERDA has conducted periodic evaluation of their low-income Empower Program.

Each of these evaluations was intended to help program managers to improve the efficiency and effectiveness of their programs. They had the added benefit of helping researchers to identify best practices with respect to the implementation of comprehensive low-income programs. Some of those best practices include:

- Collaboration with WAP and EAP – There are many ways for the IOU programs to collaborate with WAP and EAP, from co-funding on individual housing units to simply discussing what market segments will be served by the publicly-funded programs and which will be served by the ratepayer-funded programs. There is not one best model of collaboration. Rather, it is a best practice that there is collaboration.

- **Measurement and Evaluation Framework** – Many program managers have conducted program evaluations and have found that their programs were falling well short of projected savings estimates. Development of an ongoing measurement and evaluation framework can lead to continuous improvement in program outcomes. Such a framework requires:
 - **Program Database** – Development of a program database that tracks housing units, baseline conditions of the housing unit, installed measures, and funding allocations by measure.
 - **Performance Indicators** – Specification of measurement protocols to support the development of performance indicators that are correlated with targeted program outcomes.
 - **Periodic Evaluation** – Comprehensive evaluation of program performance that includes evaluation of program processes, energy impacts, and non-energy impacts.
- **Targeting** – Program evaluations have shown that targeting program services can significantly increase program performance. Two important examples are:
 - **High Usage** - Targeting the highest usage housing units and buildings for participation in comprehensive service delivery programs.
 - **Direct Install Program Gateway** – Using a low-cost direct install program as a “gateway” to identifying households that can be effectively served by comprehensive programs.

Neither the IOUs nor the Department have been directed to adopt these best practices. The purpose of this assessment is to examine the extent to which IOU programs have adopted these practices and then to make recommendations for which might have the greatest impact on the performance of the IOU low-income programs.

6.4 Program Assessment Framework

The program assessment analysis examines IOU and Department performance from three different perspectives.

- **Explicit Program Requirements** – The assessment examines whether the IOUs are complying with explicit program requirements and taking advantage of Department guidance when it is appropriate. This analysis is done at the IOU level.
- **Implicit Program Objectives** – This assessment examines the extent to which the IOU programs are addressing implicit program objectives. This analysis is done for the entire set of programs implemented by each type of IOU (i.e. natural gas vs. electric). Reference is made to specific IOU programs that furnish examples of ways to address these objectives. However, the analysis is not done at the IOU level since the IOUs are not required to meet these objectives.
- **Best Practices** – This assessment examines the extent to which the Department and the IOUs have adopted best practices related to low-income program design, implementation,

measurement, and evaluation. The analysis is with respect to the overall CIP low-income program guidance, design and implementation, and oversight.

The assessment framework is designed to help the Department and the IOUs to identify those areas where the programs have been successful in meeting the needs of low-income households and those areas where initiatives could be expected to lead to improved performance.

7.0 Assessment of Natural Gas IOU Programs

This section of the report examines the performance of the natural gas IOU programs in terms of the assessment framework outlined in Section 6. It examines performance with respect to:

- Explicit Program Requirements
- Implicit Program Objectives
- Low-Income Program Best Practices

The assessment of the performance with respect to explicit program requirements is at the IOU level since the regulatory framework requires each IOU to meet certain requirements. The assessments with respect to the implicit program objectives and the adoption of low-income program best practices considers whether the set of programs implemented by the IOUs and approved by the Department are performing in the most efficient and effective way.

7.1 Explicit Program Requirements

The assessment examines whether the IOUs are complying with explicit program requirements and taking advantage of Department guidance when it is appropriate. Our assessment of whether an IOU meets the explicit program requirements includes the following analysis:

- Spending Requirement – Did the IOU spend the required amount on low-income programs during the analysis year? Does the IOU have effective plans for spending the required amount during subsequent program years?
- Reporting Requirement – Did the IOU file all the required Plans and Reports with all the required information?

In addition to these program requirements, the Department also has issued guidance on two issues that make it easier for utilities to meet their low-income program spending requirement.

- Multifamily Buildings – Did the IOU make use of the Department guidance on multifamily buildings to increase the efficiency and effectiveness of multifamily building programs?
- Delivered Fuel Households – This guidance is not applicable to natural gas utilities and is not part of the assessment.

The assessment focuses on the 2014 program year. However, where appropriate, it examines information from later program years to furnish supplemental information.

7.1.1 LI CIP Spending Requirement

In 2014, natural gas IOUs were required to spend 0.4% of their three-year average gross residential operating revenue on low-income programs. In their Triennial Plans, IOUs propose a spending amount

for their low-income segment programs that meets or exceeds that spending requirement. As part of their Annual Status Report, each IOU reported on how their actual spending compared to their required spending.

Table 60 shows the planned and actual LI CIP spending, and how those compare to the LI CIP spending requirement for the natural gas IOUs. It shows that the natural gas IOUs reported spending about \$5.5 million on LI CIP programs in 2014, exceeding spending requirements by about \$1.4 million (33%). The natural gas IOUs fell short of their planned spending, but still exceeded the spending requirement by a significant margin.

Table 60. 2014 Natural Gas IOU LI CIP Planned and Actual Spending

Utility	Planned Spending	Reported Spending	Spending Requirement	Excess or (Shortfall)	Percent Excess or (Shortfall)
CPE	\$2,759,000	\$2,604,094 ^a	\$2,281,250	\$322,844	14%
Xcel	\$1,656,181	\$1,791,458	\$1,220,202	\$571,256	47%
MERC	\$1,294,760	\$1,056,783	\$592,374	\$464,409	78%
GPNG	\$169,689	\$69,905	\$54,662	\$15,243	28%
GMG	\$51,000	\$16,662	\$14,432	\$2,230	15%
All IOU Programs	\$5,930,630	\$5,538,902	\$4,162,920	\$1,375,982	33%

a. Includes approved spending on low-income households in market rate programs.

One important finding from 2014 was that CPE fell short of meeting its spending requirement if only the programs in their low-income segment were included in the analysis. An in-depth review of their performance during 2014 showed that the main reason for the shortfall was that the Low-Income Weatherization Project service provider was replaced during 2014 due to factors that were beyond the control of CPE. While the Commissioner could have required CPE to increase their spending for 2015 to address the 2014 shortfall, the Commissioner's decision was to add the verified spending on low-income customers in CPE's residential segment to the spending in their low-income segment. Analysis of data from 2013, 2015, and 2016 shows that CPE met the spending requirement with their low-income segment programs in all those years.

7.1.2 Reporting Requirements

As part of their Triennial Plans and Annual Status Reports, IOUs are required to report estimates of "anticipated" and "actual" participation of low-income customers and renters in their CIP programs. However, those Rules were promulgated in 2005, prior to the addition of Subd. 6 in the Next Generation Energy Act of 2007 that required IOUs to adopt programs that were designed to "directly serve the needs of low-income persons." In 2014, some IOUs reported on the number of low-income persons and

renters participating in their residential and business segment programs. Other IOUs reported only on the number of low-income persons and renters participating in their low-income segment programs.

Table 61 shows the number of low-income households and renters reported to have participated in low-income segment programs and in residential and business segment programs. This table shows that only CPE furnished a complete report on low-income and renter participants in 2014.

Table 61. 2014 Natural Gas IOU Low-Income and Renter Participation in CIP Programs

Utility	Low-Income Programs		Residential and Business Programs	
	Low-Income Customers	Renters	Low-Income Customers	Renters
CPE	3,672	2,370	10,580	15,029 ^b
Xcel Energy	1,923	NR	NR	NR
MERC	185	97 ^a	NR	1,803 ^c
Great Plains Natural Gas	28	NR	NR	NR
Greater Minnesota Gas	9	0	NR	NR
Natural Gas IOU Programs	5,817	NR	NR	NR

a. Measures rather than housing units

b. Includes renters that are not low-income

c. Planned / NR = Not Reported

In the 2014 program year, the Department did not require IOUs to comply with this reporting requirement. However, in recent reporting years, the Department did request that all IOUs furnish information on renter households. It is our assessment that this reporting is important for two reasons.

- **Low-Income Spending Requirements** – Most jurisdictions that require spending on low-income programs do so because, while low-income households are paying for energy efficiency programs through their rates, they find that low-income households do not participate in energy efficiency programs. Low-income programs are one way to address this problem. However, as shown by CPE, some verified low-income customers do participate in residential segment programs. For purposes of ongoing policy assessment, it is valuable to have that information.
- **Renter Program Participation** – The legislative intent of the statute is clear. It is expected that low-income programs should address the needs of low-income renters. IOUs need to furnish this information to give policymakers the ability to evaluate the effectiveness of existing programs in meeting that objective.

It appears that IOUs are able to comply with the request for information on renters. However, some IOUs are concerned that requesting income information from program participants is intrusive and is not particularly reliable.

We recommend that IOUs make use of CPE's method for reporting on low-income participation. CPE makes use of their energy assistance participation records to assess which participants in residential and business programs are low-income. Since not all low-income households participate in energy assistance, CPE's reports are likely to undercount low-income participation in such programs. However, the information that they provide is useful in understanding how the entire CIP portfolio affects low-income households.

Among the residential market segment programs, CPE finds that some low-income customers do participate in programs. For example, about 2.5 percent of customers who receive heating system rebates were verified as low-income, as were about 5 percent of customers receiving efficient showerheads and faucet aerators. Overall, CPE verified that at least 3% of percent of participants in their residential programs were low-income.

Similarly, CPE developed estimates of the number of renters in their LI CIP programs and their residential CIP programs. For 2014, they reported that about 5 percent of residential program participants were renters, including about 5 percent of homes receiving heating system rebates. Among LI CIP programs, the participation of renters in the Low-Income Weatherization project was only 6 percent of homes. However, all participants in the Low-Income Multi-Family Housing Project and the Low-Income Rental Efficiency Project were renters.

7.1.3 Department Guidance on Multifamily Buildings

The Department Guidance on Multifamily Buildings was designed to make it easier for utilities to engage multifamily buildings in low-income programs. A review of the 2014 Annual Status Reports and the 2017-2019 Triennial Plans shows that natural gas IOUs are taking advantage of that guidance.

- CPE Multifamily Building Program – In 2014, CPE used the Department's designated information sources to identify which multifamily buildings qualify as low-income. CPE had a residential segment multifamily building program. Low-income buildings received a higher incentive and were reported in the low-income program segment.
- CPE Rental Efficiency Program – In 2014, Energy Cents identified small multifamily buildings that were low-income using the Department's definition of a low-income building and then were able to install both building-level and unit-level energy efficiency measures in all units, even if not all renters were low-income.
- MERC Multifamily Direct Install Program – In 2014, MERC had a business segment multifamily building program that furnished higher incentives for direct install measures for low-income buildings compared to those that were not identified as low-income.

The 2017-2019 Triennial Plans for CPE and Xcel show that they are working together to implement a more comprehensive multifamily building program that addresses a wide range of building-level and unit-level energy efficiency measures for building owners who are interested in using CIP to have a greater impact on the energy usage in their buildings. For both utilities, this program is reported as a business segment program. But, buildings that can be identified as low-income using the information sources in the Department's guidance are designated to receive a higher incentive than buildings that are not low-income.

Both GPNG and GMG report that they are aware of the Department's guidance on multifamily buildings. However, there are relatively few multifamily buildings in their service territories and they have fulfilled their spending objectives with the existing programs.

7.2 Implicit Program Objectives

There are several ways in which the Statute, the Rules, and Commissioner Orders and Decisions have established program objectives that are not clearly defined as program requirements. For purposes of this analysis, we assess each IOU's low-income programs from the following perspectives:

- Renters – What percent of low-income program funds are used to deliver services to low-income renters? How does the funding allocated to serving renters compare to the share of low-income households in Minnesota that are renters?
- WAP Protocols – To what extent have the IOU low-income programs implemented protocols that are consistent with the WAP protocols?
 - Health and Safety Protocols – Does the program have procedures to assess the health and safety status of the housing unit and to ensure that installed measures do not adversely affect that status?
 - Quality Control Protocols – Does the program have quality control protocols that are consistent with those implemented by WAP? Do the IOUs take responsibility for ensuring that those protocols are implemented?
 - Measure Selection and Installation – Have the IOUs considered whether the WAP measure selection and installation protocols are appropriate for their low-income programs? If they are, have the IOUs taken responsibility for ensuring that those protocols are met? If not, have they made it clear to their service providers that a different measure selection and/or installation procedure should be implemented?

Since the IOUs have not been directed by the Department to assess their own programs based on these parameters, it is not appropriate to hold the IOUs accountable for failing to meet one or more of these objectives. Rather, it is the intent of this assessment to determine whether the IOUs, in the context of designing and implementing low-income programs, have addressed some of these implicit program objectives.

7.2.1 Serving Low-Income Renters

Table 8 shows that 57 percent of low-income households are renters. About 27 percent of manufactured and single family homes are renter occupied. Over 90 percent of small multifamily housing units (i.e., buildings with 2 to 4 units) are renter-occupied.

The statute does not require that a certain percentage of low-income program funds be spent on renter-occupied housing. The Minnesota Rules require IOUs to report on the number of renters served. But, the Department does not require IOUs to allocate a certain share of funding to serve low-income renters. However, it is useful to consider how many low-income renters are served by the programs and what share of low-income program funding is allocated to renters in comparison to their share of the low-income population.

Renters are served by the IOU natural gas programs in several different ways.

- **Comprehensive Single Family Home Programs** – All of the programs implemented by the natural gas IOUs serve both owner-occupied and rental units. However, while the participant in the program is the dwelling occupant, the program also must engage with the building owner before any work can be completed in a renter-occupied building.
- **Multifamily Building Programs** – In 2014, CPE implemented a low-income multifamily building program and MERC identified low-income buildings in their residential multifamily program. In the 2017-2019 planning period, CPE and Xcel are working together to implement a comprehensive multifamily program.
- **Other Programs** – In 2014, CPE implemented two other programs that engaged renters. The Rental Efficiency program worked with building owners to deliver energy efficiency services to single family and small multifamily buildings. The Non-Profit Affordable Housing Project delivered energy efficiency rebates to some rental units.

Both CPE and Xcel have developed programs that include and target renter-occupied units. Using 2017 Plans to examine spending allocations, including the estimated low-income share of the Multifamily Building Efficiency programs, we estimate that CPE and Xcel each will spend about 20 to 25 percent of their low-income program dollars on rental units. IOUs are not required to target a specific share of funding to low-income renters. Any accomplishments with respect to serving these households are mainly due to program innovations developed by the IOUs. However, it seems that policymakers should consider whether allocation of about 25 percent of funds to rental units is appropriate when about 57 percent of low-income households are renters.

7.2.2 Making Use of WAP Protocols

The Department has encouraged utilities to partner with WAP service providers to deliver program services. In at least one case where the program implementation was not done by a WAP service provider, the Commissioner ordered the IOU to ensure that the program used WAP health and safety protocols and measure selection procedures. The implication is that, for comprehensive single family

homes, service providers should either adopt WAP guidelines or identify why the WAP guideline is not appropriate for that particular program.

Among the comprehensive single family natural gas IOU programs, the following contract with WAP service providers to deliver program services.

- CPE Weatherization Project
- Xcel HESP – Western Metropolitan and Outstate Areas
- MERC Low-Income Weatherization
- GPNG CAP Weatherization

In all of those programs, the housing units were served in a way that followed WAP guidelines for health and safety, quality control, and measure selection and installation. However, our assessment raises at least three important questions:

- Oversight - In-depth interviews with the IOUs found that, rather than verifying that those protocols were being followed, the IOUs counted on the service delivery agencies and the state oversight of those agencies to ensure that those guidelines were being followed.
- Allocation of Health and Safety Costs – The WAP program has detailed information on the average cost for remediation of health and safety issues for housing units served by WAP. There was no information in the IOU program Plans as to whether CIP funds were expected to pay for those measures, except for the few cases where a specific type of measure was identified as eligible.
- Deviation from WAP Guidelines – There are several situations where it is appropriate for ratepayer-funded programs to deviate from WAP guidelines. For example, the WAP program does not allow any home that has been treated since 1994 to be served by the program. However, there are many circumstances where it would be appropriate for the CIP program to treat such a housing unit. Similarly, the IOU valuation of the benefits of a measure is likely to be different from the WAP programs. But, the state WAP program office does not furnish service delivery agencies with information on how to address such situations.

For natural gas programs delivered by WAP service providers, there are some important ways that both the IOUs and the Department could work together to ensure that the procedures implemented are consistent with both WAP guidelines and ratepayer-funding objectives.

The following comprehensive single family natural gas IOU programs do not contract with WAP service providers to deliver program services.

- CPE Rental Efficiency Project
- Xcel HESP – Eastern Metropolitan Region
- MERC 4U2 Program

In-depth interviews with the IOUs and the service providers found that those programs either followed WAP guidelines as ordered by the Commissioner (4U2 program) or were implemented by an

organization that reported that they followed guidelines similar to those implemented by WAP. However, our analysis of their responses raises at least three important questions:

- Oversight - In-depth interviews with the IOUs found that they delegated quality control to the program implementer. There was no independent oversight of the work of those organizations.
- Allocation of Health and Safety Costs – There was no formal discussion of health and safety protocols. Energy Cents, the Xcel HESP implementer, raised this as an important problem for resolution between the IOU and the Department.
- Deviation from WAP Guidelines – The CPE Rental Efficiency and the Xcel HESP used other measure selection and installation guidelines. There is no assessment for where these are similar to or vary from WAP guidelines.

For comprehensive natural gas programs delivered by non-WAP service providers, it would be appropriate for the program Plans to identify where the protocols are similar to or differ from the standard WAP guidelines.

The other natural gas programs do not deliver comprehensive energy services and would need to apply different standards for health and safety, quality control, and measure selection and installation. Those programs include:

- CPE Non-Profit Affordable Housing
- CPE Heating Equipment Tune-Ups
- CPE Low-Income Multifamily
- Xcel Low Income Home Energy Squad
- GPNG Equipment Replacement

It would be appropriate for those program Plans to outline the standards for those programs.

7.3 Low-Income Program Best Practices

This assessment examines the extent to which the Department and the IOUs have adopted best practices related to low-income program design, implementation, measurement, and evaluation. The best practice assessment considers the following questions.

- Collaboration with WAP and EAP – How does the program work in a collaborative way with WAP and EAP to take advantage of opportunities to increase program efficiency and effectiveness? How does the program work with WAP and EAP to minimize duplication of effort?
- Measurement and Evaluation Framework – What measurement and evaluation strategy has the program adopted to ensure that the programs are achieving their expected outcomes? How does the information system developed by the program support measurement and evaluation activities, and the development of valid indicators to track progress toward improved performance?

- Targeting – Does the program have effective strategies for targeting services in a way that maximizes program impacts and cost-effectiveness?

Neither the IOUs nor the Department have been directed to adopt these best practices. The purpose of this assessment is to examine the extent to which IOU programs have adopted these practices and then to make recommendations for which might have the greatest impact on the performance of the IOU low-income programs.

7.3.1 Collaboration with EAP and WAP

There are several ways that the Minnesota EAP and WAP programs have developed procedures that have made it easier for the natural gas IOUs to develop effective low-income programs.

- Definition of Low-Income – The EAP and WAP programs have clear guidelines for identifying income-eligible households. Adopting those guidelines makes it easier for IOU programs to justify their definition.
- Application and Income Verification Procedures – The EAP, WAP, and CIP units jointly developed an application with specified income verification procedures that covers all three programs – EAP, WAP, and CIP. The IOUs can make use of that application form model and follow those income verification procedures, even if they are not working with EAP or WAP service provider.
- Measure Selection and Installation – The WAP program has very detailed guidance on measure selection and installation, including health and safety assessments and quality control protocols. The IOUs can adopt those practices and can be ensured that their programs will meet good quality standards.

Where appropriate, the Department also has developed guidance for CIP programs that differs from the EAP or WAP guidance. For example, the guidance on multifamily buildings issued by the Department lowers the cost of identifying income-eligible multifamily buildings and increases the amount of energy savings that can be attained from programs serving those buildings.

Table 62 shows the extent to which the natural gas IOUs have made use of the procedures and guidance developed by the Department. Important findings include:

- Low-Income – Most of the programs use the WAP definition for low-income. For the nonprofit affordable housing program, CPE allows the organizations to use their existing definition. The MERC 4U2 program is a special program that was specifically adopted to serve a population different from WAP.
- Income Verification – Many of the programs use the WAP/EAP/CIP application procedures or the Department’s guidance on multifamily buildings. For some of the programs, the service delivery agency must complete income verification independent of existing programs. For the 4U2 program in particular, Franklin Energy reports that is challenging because the customers served have not participated in programs with income verification previously.

- **Service Providers and Protocols** – Many of the natural gas programs work with WAP service providers and use the WAP protocol. Where IOUs do not use WAP service providers, many use organizations that have BPI-certified technicians. WAP and BPI certifications and protocols are comparable, though not always the same. Xcel technical staff have extensive experience in designing and implementing programs in jurisdictions throughout the country. They indicate that they sometimes vary from the WAP or BPI protocol for certain measures for HESP and LI-HES.

Table 62. Natural Gas IOU LI CIP Program Design

Utility Program	Definition of Low-Income	Income Verification Procedure	Work with WAP Service Providers	Protocols Applied
CPE Weatherization	WAP	EAP/WAP/CIP	Yes	WAP
CPE Non-Profit Affordable Housing	80% of Area Median	Nonprofit Agency	No – CPE	NR
CPE Multifamily Building	Multifamily Policy	Multifamily Policy	No – CPE	NR
CPE System Tune-Ups	NR	NR	No – CPE	NR
CPE Rental Efficiency	Multifamily Policy	Documentation	No – Energy Cents	BPI
Xcel HESP West	WAP	EAP/WAP/CIP	Yes	WAP / Xcel
Xcel HESP East	WAP	Xcel Power On	No – Energy Cents	BPI / Xcel
Xcel LI-HES	WAP	Self-Certification	No – NEC	BPI /Xcel
MERC LI Weatherization	WAP	EAP/WAP/CIP	Yes	WAP
MERC 4U2	300% of Poverty	Documentation	No – Franklin Energy	WAP
GPNG CAP Weatherization	WAP	EAP/WAP/CIP	Yes	WAP
GMG Home Energy Services	WAP	Documentation	No – NEC	BPI

NR = Not Report

In general, this analysis shows that the Department and the IOUs have worked together in many ways to increase the efficiency and effectiveness of the programs.

Our analysis found that there were several ways in which there could be better coordination among EAP, WAP, and the IOUs.

- **EAP ERR Program** – As discussed in Section 2, EAP invests a significant amount of funding (\$6.0 million to serve 4,692) to deliver heating equipment services to low-income households. However, that program, while coordinated with WAP in some ways, is separate from the IOU low-income programs and some IOU program managers were not even aware that the program was available. It is appropriate for the EAP, WAP, and IOU program managers to discuss ways to collaborate on equipment-related issues.
- **Service Territory Overlap** – There are at least three places where a WAP service provider’s service territory overlaps with an IOU contractor service territory. In the MERC territory, the Low-Income Weatherization program is implemented by WAP service providers and the 4U2 program is implemented by Franklin Energy. In-depth interviews suggest that those two organizations are working with different clients and that there is some collaboration between the two programs. [For example, when a WAP service provider identifies a customer who needs energy services but is over income for WAP, they refer the customer to the 4U2 program.] In Xcel’s eastern metropolitan region, Energy Cents delivers HESP and a WAP service provider delivers similar services using WAP and EAP/WX funding. It seems that it would be appropriate for the Department’s WAP office and Xcel to develop procedures to ensure that the programs do not duplicate services. Similarly, the Xcel LI-HES program delivers services to a large number of low-income customers each year and it seems that it would make sense to identify how best to use the information developed in those programs.
- **Communication on Health and Safety Protocols and Costs** – The Department’s WAP office has developed detailed protocols for health and safety assessments, and service delivery guidelines for their agencies. The WAP office has also collected and analyzed detailed information on the cost of required health and safety measures installed by their agencies. Given the importance of health and safety in this sector, it would be appropriate for the Department to communicate those findings to the IOUs and to initiate discussions with the IOUs about how to address health and safety issues that represent barriers to the delivery of comprehensive energy efficiency services to low-income households.
- **Information System** – The Department’s WAP office has a database that service delivery agencies use to record information on housing units served by the program. A significant number of households served by WAP also receive funding from IOU low-income programs. It is likely that there is some opportunity for that database to furnish some useful information to the IOUs about the clients that are served.

These are a few ways that the Department and the IOUs could work together to improve the efficiency and effectiveness of the EAP, WAP, and IOU low-income programs.

7.3.2 Measurement and Evaluation Strategy

Low-income program evaluations have demonstrated the important of having a systematic measurement and evaluation strategy that develops information on program performance and furnishes ongoing feedback for program improvement. State-level WAP program evaluations have demonstrated significant differences in the energy savings levels achieved by WAP agencies; some

agencies achieve savings less than one half the state average while others achieve savings that are more than 50 percent higher than the state average. Analyses of the differences in performance among those agencies demonstrate that a number of factors can lead to those differences in performance, even though the individual agencies are using the same protocols and all have regular monitoring and oversight by the state WAP office. As such, any set of parameter-based estimates of energy savings is vulnerable to understating or overstating the actual accomplishments of the program. We find that direct measurement of energy savings along with detailed observations and inspections are the only reliable way to determine the energy savings from a program and identify specific ways to improve the program outcomes.

In 2006, the Commissioner issued an Order that required IOUs to conduct measurement and verification of the highest priority projects. The targeted projects were mainly C&I projects in which the IOU had invested a substantial amount of funding and which accounted for a substantial fraction of an IOU's total projected energy savings. Those projects have detailed measurement and verification plans that are reviewed in detail by Department staff.

For other types of programs, the energy savings estimation strategy is for the Department to contract with experts to develop the Minnesota Technical Reference Manual and to encourage the IOUs to make use of the TRM for purposes of projecting savings from the measures installed by each program. In general, the IOUs make use of this strategy for projecting energy savings from low-income programs. However, in some cases, the IOUs use the energy savings values output from a low-income measure selection assessment tool (e.g., NEAT) instead of the TRM values.

During in-depth interviews with IOU program managers, they reported that they perceive that the Department does not require that IOUs implement measurement and verification procedures, or conduct evaluations of their low-income programs. While some of the IOUs indicated that they have conducted at least one program evaluation in the past, only Xcel indicated that they have an ongoing measurement and verification strategy for their low-income programs. Moreover, even the Xcel strategy does not include billing analysis of energy savings.

This approach falls short of low-income program best practices in three ways.

- **Verification of TRM / Energy Savings Inputs** – One important component of an effective measurement and verification strategy is to ensure that the IOUs are collecting the correct information and using it properly in calculating program energy savings. It is common practice in other jurisdictions for third party technical experts to review an IOUs program records to verify that these procedures are being implemented properly. The Department has not required the IOUs to conduct this verification for their low-income programs.
- **Measurement and Verification** – It is common for utilities to specify protocols for third party measurement and verification of measures installed by low-income programs. These procedures might include desk reviews of invoices to ensure that qualified equipment was installed, telephone or email contacts with program participants to verify service delivery and satisfaction, and field visits to document that equipment is installed properly. Xcel has a measurement and

verification protocol that includes these program elements. All other IOUs reported that their primary measurement and verification procedures are desk review of contractor paperwork.

- **Program Evaluation** – Most low-income programs conduct periodic evaluations that include billing analysis to assess program-level savings rates, as well as other types of analysis procedures that develop information on program implementation procedures or other factors that affect program performance. Such evaluations often find energy savings values that are different from projections and identify specific remediation and performance tracking procedures that improve program performance over time. None of the natural gas IOUs have conducted this type of evaluation.

It is important for the Department to review the Commissioner Order on measurement and verification procedures and to consider whether the intent of the original Order is consistent with the status of measurement and verification procedures for low-income programs.

7.3.3 Program Targeting

Low-income program evaluations have identified some specific targeting procedures that have increased energy savings and other benefits from low-income programs. Natural gas IOUs have not consistently adopted these targeting strategies.

- **High Users** – Program evaluations have found that high energy users generally have more energy saving opportunities (i.e., more energy efficiency measures are cost-effective to install) and higher energy savings from each measure installed. Implementation of this strategy increases program effectiveness by increasing the measure-level savings and lowering the average fixed costs for delivering each measure. None of the natural gas IOUs explicitly use this strategy to increase savings. Those IOUs that co-fund service delivery with WAP agencies may be taking advantage of such targeting if that strategy is used by the WAP agency.
- **Non-energy Benefits** – Recent research has shown that comprehensive low-income energy efficiency programs can deliver substantial benefits in terms of reducing indoor air quality problems that can exacerbate health problems. Programs that target comprehensive service delivery to households with existing health problems can achieve both energy savings and non-energy benefits. None of the natural gas IOUs are currently targeting these households.
- **Effective Screening Procedures** – It is costly to conduct assessments for the delivery of comprehensive energy services. Many low-income programs have developed procedures that attempt to conduct advance screening to assess the readiness of the household and housing unit to participate in the program, as well as the housing unit's need for program services. The Xcel LI-HES program is a good example of such a program; it furnishes low-cost direct install measures to customers and assesses their potential for more comprehensive services. None of the other natural gas IOUs reported implementing such procedures.

The natural gas IOUs are not required to target their programs. More in-depth analysis of the effectiveness of the Xcel LI-HES program for purposes of screening might help the Department and the other IOUs to ascertain whether that program should be replicated.

7.4 Summary of Findings

Our assessment considered whether the IOUs are meeting the explicit requirements associated with the CIP low-income programs, addressing the implicit program objectives, and adopting low-income program best practices.

With respect to explicit program requirements and Department guidance, we find that the IOUs are currently meeting most of the program requirements.

- Spending Requirement – All the IOUs are meeting or exceeding the low-income spending requirement.
- Reporting Requirements – All the IOUs are filing the required reports with the required information on their low-income programs. Some of the IOUs are not reporting on the number of low-income households that are participating in programs in the residential and business segments.
- Guidance on Multifamily Buildings – The IOUs that serve multifamily buildings are taking advantage of the program guidance.

With respect to the implicit program objectives, we find that the IOUs have made important progress toward achieving those objectives.

- Serving Low-Income Renters – CPE and Xcel have implemented programs that are explicitly designed to serve low-income renters. Each of those IOUs spends 20 to 25 percent of their low-income program funds serving low-income renters.
- Making Use of WAP Protocols – Some IOU programs are implemented by WAP service providers and use WAP protocols, including health and safety protocols and quality control procedures. However, we find that the IOUs are not taking responsibility for verifying that these protocols are followed, or for determining how to address these issues in their programs that are implemented by other types of service providers.

With respect to low-income program best practices, we find that the IOUs and the Department could improve their performance.

- Program Collaboration – We find that the EAP and WAP offices have developed some procedures that facilitate the implementation of IOU low-income programs. For example, the EAP/WAP/CIP program intake form and procedures is useful for streamlining program intake procedures. However, there are a number of collaboration and coordination opportunities that are not being addressed.

- Measurement and Verification and Program Evaluation – Among the IOUs, only Xcel has an active measurement and verification procedure. None of the IOUs conducts periodic evaluations of their low-income programs. This represents a major barrier to achieving the highest performing low-income programs.
- Program Targeting – None of the IOU programs explicitly targets higher users or households for whom the low-income programs would deliver significant non-energy benefits. The Xcel LI-HES program is designed to screen housing units for comprehensive service delivery and might offer a good program model for other natural gas IOUs to consider.

Overall, the natural gas IOU programs perform best with respect to the explicit program requirements, have made progress toward achieving implicit program goals, but generally have not adopted low-income program best practices.

8.0 Assessment of Electric IOU Programs

This section of the report examines the performance of the electric IOU programs in terms of the assessment framework outlined in Section 6. It examines performance with respect to:

- Explicit Program Requirements
- Implicit Program Objectives
- Low-Income Program Best Practices

The assessment of the performance with respect to explicit program requirements is at the IOU level since the regulatory framework requires each IOU to meet certain requirements. The assessments with respect to the implicit program objectives and the adoption of low-income program best practices considers whether the set of programs implemented by the IOUs and approved by the Department are performing in the most efficient and effective way.

8.1 Explicit Program Requirements

The assessment examines whether the IOUs are complying with explicit program requirements and taking advantage of Department guidance when it is appropriate. Our assessment of whether an IOU meets the explicit program requirements includes the following analysis:

- Spending Requirement – Did the IOU spend the required amount on low-income programs during the analysis year? Does the IOU have effective plans for spending the required amount during subsequent program years?
- Reporting Requirement – Did the IOU file all of the required Plans and Reports with all required information?

In addition to these program requirements, the Department also has issued guidance on two issues that make it easier for utilities to meet their low-income program spending requirement.

- Multifamily Buildings – Did the IOU make use of the Department guidance on multifamily buildings to increase the efficiency and effectiveness of multifamily building programs?
- Delivered Fuel Households – Did the IOU make use of the Department guidance on furnishing space heating and water heating services to customers who use a delivered fuel or natural gas from a nonparticipating natural gas utility?

The assessment focuses on the 2014 program year. However, where appropriate, it examines information from later program years to furnish supplemental information.

8.1.1 LI CIP Spending Requirement

In 2014, electric IOUs were required to spend 0.2% of their three-year average gross residential operating revenue on low-income programs. In their Triennial Plans, IOUs propose a spending amount for their low-income segment programs that meets or exceeds that spending requirement. As part of their Annual Status Report, each IOU reported on how their actual spending compared to their required spending.

Table 63 shows the planned and actual LI CIP spending, and how those compare to the LI CIP spending requirement for the electric IOUs. This table shows that the electric IOUs reported spending about \$2.9 million on LI CIP programs in 2014, exceeding spending requirements by over \$732,000 (33%). The electric IOUs fell short of their planned spending, but still exceeded the spending requirement by a significant margin.

Table 63. 2014 Electric IOU LI CIP Planned and Reported Spending

Utility	Planned Spending	Reported Spending	Spending Requirement	Excess or (Shortfall)	Percent Excess or (Shortfall)
Xcel Energy	\$2,568,863	\$2,222,627	\$1,902,024	\$320,603	17%
Minnesota Power	\$589,136	\$565,405	\$198,816	\$366,589	184%
Otter Tail Power	\$150,000	\$142,588	\$97,671	\$44,917	46%
Electric IOU Programs	\$3,307,999	\$2,930,620	\$2,198,511	\$732,109	33%

8.1.2 Reporting Requirements

As part of their Triennial Plans and Annual Status Reports, IOUs are required to report estimates of “anticipated” and “actual” participation of low-income customers and renters in their CIP programs. However, those Rules were promulgated in 2005, prior to the addition of Subd. 6 in the Next Generation Energy Act of 2007 that required IOUs to adopt programs that were designed to “directly serve the needs of low-income persons.” In 2014, some IOUs reported on the number of low-income persons and renters participating in their residential and business segment programs. Other IOUs reported only on the number of low-income persons and renters participating in their low-income segment programs.

Table 64 shows that, among the electric IOUs, only Otter Tail Power reported on the number of renter participants in the LI CIP programs and none of the electric IOUs reported on low-income participation in residential CIP programs. It is clear from CPE’s reports that these data are useful in getting a more complete understanding of low-income and renter participation in programs. And, it also is clear that by matching CIP program records against energy assistance records, the utility has a nonintrusive procedure for identifying at least part of the low-income population. [Note: The EAP program allows low-income households to split their energy assistance grant between their natural gas or delivered fuel

supplier and their electric supplier. So, even for customers that do not use electricity for their main heating fuel, the IOU often will have a record of EAP program participation.

Table 64. 2014 Electric IOU LI CIP Low-Income and Renter Participation in CIP Programs

Utility	LI CIP Programs		Residential and Business Programs	
	Low-Income Customers	Renters	Low-Income Customers	Renters
Xcel Energy	5,766	NR	NR	NR
Minnesota Power	NR	NR	NR	NR
Otter Tail Power	100	1	NR	NR
Electric IOU Programs	6,866	NR	NR	NR

NR = Not Reported

In the 2014 program year, the Department did not require IOUs to comply with this reporting requirement. However, in recent reporting years, the Department did request that all IOUs furnish information on renter households.

We recommend that IOUs make use of CPE’s method for reporting on low-income participation. CPE makes use of their energy assistance participation records to assess which participants in residential and business programs are low-income. Since not all low-income households participate in energy assistance, CPE’s reports are likely to undercount low-income participation in such programs. However, the information that they provide is useful in understanding how the entire CIP portfolio affects low-income households.

8.1.3 Department Guidance on Multifamily Buildings

The Department Guidance on Multifamily Buildings was designed to make it easier for utilities to engage multifamily buildings in low-income programs. A review of the 2014 Annual Status Reports and the 2017-2019 Triennial Plans shows that natural gas IOUs are taking advantage of that guidance.

- Xcel Multifamily Energy Savings Program – In 2014, Xcel used the Department’s designated information sources to identify which multifamily buildings qualify as low-income and furnished unit-level measures to all units in low-income multifamily buildings.

The 2017-2019 Triennial Plans for CPE and Xcel show that they are working together to implement a more comprehensive multifamily building program that addresses a wide range of building-level and unit-level energy efficiency measures for building owners who are interested in using CIP to have a greater impact on the energy usage in their buildings. For both utilities, this program is reported as a business segment program. But, buildings that can be identified as low-income using the information

sources in the Department's guidance are designated to receive a higher incentive than buildings that are not low-income.

Both Minnesota Power and Otter Tail Power report that they are aware of the Department's guidance on multifamily buildings. However, there are relatively few multifamily buildings in their service territories and they have fulfilled their spending objectives with the existing programs.

8.1.4 Department Guidance on Delivered Fuel and Natural Gas

The Department Guidance on Delivered Fuels was designed to give electric utilities another option for serving low-income customers. However, in 2014, of the three electric IOUs, only Minnesota Power made use of the guidance by offering to replace inoperable furnaces for low-income customers as part of their low-income program. However, none of the WAP service delivery agencies working with Minnesota Power identified an opportunity to do that in 2014. Since the electric IOUs all exceeded their required low-income spending amount, there was no compelling reason to use that guidance. [Note: Minnesota Power's 2017-2019 Triennial Plan included plans for using this guidance to furnish heating equipment to delivered fuel customers. The guidance was used by a number of COUs in 2014.]

8.2 Implicit Program Objectives

There are several ways in which the Statute, the Rules, and Commissioner Orders and Decisions have established program objectives that are not clearly defined as program requirements. For purposes of this analysis, we assess each IOU's low-income programs from the following perspectives:

- Renters – What percent of low-income program funds are used to deliver services to low-income renters? How does the funding allocated to serving renters compare to the share of low-income households in Minnesota that are renters?
- WAP Protocols – To what extent have the IOU low-income programs implemented protocols that are consistent with the WAP protocols?
 - Health and Safety Protocols – Does the program have procedures to assess the health and safety status of the housing unit and ensure that installed measures do not adversely affect that status?
 - Quality Control Protocols – Does the program have quality control protocols that are consistent with those implemented by WAP? Does the IOU take responsibility for ensuring that those protocols are implemented?
 - Measure Selection and Installation – Has the IOU considered whether the WAP measure selection and installation protocols are appropriate for their low-income programs? If they are, has the IOU taken responsibility for ensuring that those protocols are met? If not, has the IOU made it clear to the service provider that a different measure selection and/or installation procedure should be implemented?

- **Cost-Effectiveness** – What actions has the IOU taken to ensure that each program is as cost-effective as possible? Has the IOU considered ways to re-allocate resources in such a way that the combined set of low-income programs would be more cost-effective?

Since the IOUs have not been directed by the Department to assess their own programs based on these parameters, it is not appropriate to hold the IOUs accountable for failing to meet one or more of these objectives. Rather, it is the intent of this assessment to determine whether the IOUs, in the context of designing and implementing low-income programs, have address some of these implicit program objectives.

8.2.1 Serving Low-Income Renters

Table 8 shows that 57 percent of low-income households are renters. About 27 percent of manufactured and single family homes are renter-occupied. Over 90 percent of small multifamily housing units (i.e., buildings with 2 to 4 units) are renter-occupied.

The statute does not require that a certain percentage of low-income program funds be spent on renter-occupied housing. The Minnesota Rules require IOUs to report on the number of renters served. While the Department does not require IOUs to allocate a certain share of funding to serve low-income renters, it is useful to consider how many low-income renters are served by the programs and what share of low-income program funding is allocated to renters in comparison to their share of the low-income population.

Renters are served by the IOU electric programs in several different ways.

- **Comprehensive Single Family Home Programs** – All of the programs implemented by the electric IOUs serve both owner-occupied and rental units. However, while the participant in the program is the dwelling occupant, the program also must engage with the building owner before any work can be completed.
- **Multifamily Building Programs** – In 2014, Xcel implemented the Multifamily Energy Savings Program that delivered services directly to renters in buildings that were determined to be low-income.
- **Other Programs** – In 2014, Xcel implemented the LI-HES program. While they did not report the number of renters in their 2014 Annual Status Report, their 2017-2109 Triennial Plan estimated that about 35 percent of LI-HES participants were renters.

Xcel has developed programs that include and target renter-occupied units. Using 2017 Plans to examine spending allocations, including the estimated low-income share of the Multifamily Building Efficiency programs, we estimate that Xcel will spend as much as 60 percent of their low-income program dollars on rental units. Since about 57 percent of low-income customers are renters, it appears that the implementation of the MESP and Multifamily Building Efficiency Program will result in Xcel spending an appropriate amount of funds on renters in 2017.

8.2.2 Making Use of WAP Protocols

The Department has encouraged utilities to partner with WAP service providers to deliver program services. In at least one case where the program implementation was not a WAP service provider, the Commissioner ordered the IOU to ensure that the program used WAP health and safety protocols and measure selection procedures. The implication is that, for comprehensive single family homes, service providers should either adopt WAP guidelines or identify why the WAP guideline is not appropriate for that particular program.

Among the comprehensive single family electric IOU programs, the following contract with WAP service providers to deliver program services.

- Xcel HESP – Western Metropolitan and Outstate Areas
- Minnesota Power - Energy Partners
- Otter Tail Power – House Therapy Program

In all those programs, the housing units were served in a way that followed WAP guidelines for health and safety, quality control, and measure selection and installation. However, our assessment raises at least three important questions:

- Oversight - In-depth interviews with the IOUs found that, rather than verifying that those protocols were being followed, the IOUs counted on the service delivery agencies and the state oversight of those agencies to ensure that those guidelines were being followed.
- Allocation of Health and Safety Costs – The WAP program has detailed information on the average cost for remediation of health and safety issues for housing units served by WAP. There was no information in the IOU program Plans as to whether CIP funds were expected to pay for those measures, except for the few cases where a specific type of measure was identified as eligible.
- Deviation from WAP Guidelines – There are several situations where it is appropriate for ratepayer-funded programs to deviate from WAP guidelines. For example, the WAP program does not allow any home that has been treated since 1994 to be served by the program. However, there are many circumstances where it would be appropriate for the CIP program to treat such a housing unit, particularly for electric energy efficiency measures. Similarly, the IOU valuation of the benefits of a measure is likely to be different from the WAP programs. But, the Minnesota WAP program does not furnish service delivery agencies with information on how to address such situations.

For electric programs delivered by WAP service providers, there are some important ways that both the IOUs and the Department could work together to ensure that the procedures implemented are consistent with both WAP guidelines and ratepayer funding objectives.

The following comprehensive single family electric IOU programs do not contract with WAP service providers to deliver program services.

- Xcel HESP – Eastern Metropolitan Region

In-depth interviews with Energy Cents, the Xcel HESP program administrator, found that this program followed BPI guidelines that generally are consistent with WAP guidelines. However, our assessment raises two questions:

- Oversight - In-depth interviews with Xcel found that they delegated quality control to the program implementer. There was no independent oversight of the work of those organizations except in the Xcel measurement and verification protocol.
- Allocation of Health and Safety Costs – There was no formal discussion of health and safety protocols. Energy Cents, the Xcel HESP implementer, raised this as an important problem for resolution between the IOU and the Department.

For comprehensive electric programs delivered by non-WAP service providers, it would be appropriate for the program Plans to identify where the protocols are similar to or differ from the standard WAP guidelines.

The other electric programs do not deliver comprehensive energy services and would need to apply different standards for health and safety, quality control, and measure selection and installation. Those programs include:

- Xcel LI-HES
- Xcel MESP

It would be appropriate for those program Plans to outline the standards for those programs.

8.3 Low-Income Program Best Practices

This assessment examines the extent to which the Department and the IOUs have adopted best practices related to low-income program design, implementation, measurement, and evaluation. The best practice assessment considers the following questions.

- Collaboration with WAP and EAP – How does the program work in a collaborative way with WAP and EAP to take advantage of opportunities to increase program efficiency and effectiveness? How does the program work with WAP and EAP to minimize duplication of effort?
- Measurement and Evaluation Framework – What measurement and evaluation strategy has the program adopted to ensure that the programs are achieving their expected outcomes? How does the information system developed by the program support measurement and evaluation activities and development of valid indicators to track progress toward improved performance?
- Targeting – Does the program have effective strategies for targeting services in a way that maximizes program impacts and cost-effectiveness?

Neither the IOUs nor the Department have been directed to adopt these best practices. The purpose of this assessment is to examine the extent to which IOU programs have adopted these practices and then to make recommendations for which might have the greatest impact on the performance of the IOU low-income programs.

8.3.1 Collaboration with EAP and WAP

There are several ways that the Minnesota EAP and WAP programs have developed procedures that have made it easier for the electric IOUs to develop effective low-income programs.

- **Definition of Low-Income** – The EAP and WAP programs have clear guidelines for identifying income-eligible households. Adopting those guidelines makes it easier for IOU programs to justify their definition.
- **Application and Income Verification Procedures** – The EAP, WAP, and CIP units jointly developed an application with specified income verification procedures that covers all three programs – EAP, WAP, and CIP. The IOUs can make use of that application form model and follow those income verification procedures, even if they are not working with the EAP or WAP service provider.
- **Measure Selection and Installation** – The WAP program does not have guidance on measure selection and installation for all of the electric energy efficiency measures that are considered to be eligible by the IOUs for electric low-income CIP programs. However, the health and safety assessments and quality control protocols are still relevant to electric low-income programs. The IOUs can adopt those practices and be assured that their programs will meet good quality standards.

Where appropriate, the Department also has developed guidance for CIP programs that differs from the EAP or WAP guidance. For example, the guidance on multifamily buildings issued by the Department lowers the cost of identifying income-eligible multifamily buildings and increases the amount of energy savings that can be attained from programs serving those buildings.

Table 65 shows the extent to which the electric IOUs have made use of the procedures and guidance developed by the Department. Important findings include:

- **Low-Income** – Most of the programs use the WAP definition for low-income. The Xcel MESP program uses the Department multifamily guidance.
- **Income Verification** – Many of the programs use the WAP/EAP/CIP application procedures or the Department’s guidance on multifamily buildings. The Xcel HESP in the eastern metropolitan region uses Xcel’s low-income affordability program records.
- **Service Providers and Protocols** – Most of the electric programs work with WAP service providers and use the WAP protocol. Where IOUs do not use WAP service providers, they use organizations that have BPI-certified technicians. WAP and BPI certifications and protocols are comparable, though not always same. Xcel technical staff have extensive experience in

designing and implementing programs in jurisdictions throughout the country. They indicate that they sometimes vary from the WAP or BPI protocol for certain measures for HESP and LI-HES. They also designed the protocols for MESP.

In general, this analysis shows that the Department and the IOUs have worked together in many ways to increase the efficiency and effectiveness of the programs.

Table 65. Electric IOU LI CIP Program Design

Utility Program	Definition of Low-Income	Income Verification Procedure	Work with WAP Service Providers	Protocols Applied
Xcel HESP West	WAP	EAP/WAP/CIP	Yes	WAP / Xcel
Xcel HESP East	WAP	Xcel Power On	No – Energy Cents	BPI / Xcel
Xcel LI-HES	WAP	Self-Certification	No – NEC	BPI
Xcel MESP	Multifamily Policy	Multifamily Policy	No – Franklin Energy	NR
MNP Energy Partners	WAP	EAP/WAP/CIP	Yes	WAP
OTP House Therapy	WAP	EAP/WAP/CIP	Yes	WAP

NR = Not Reported

Our analysis found that there were several ways in which there could be better coordination among EAP, WAP, and the IOUs.

- **Service Territory Overlap** – In Xcel’s eastern metropolitan region, Energy Cents delivers HESP and a WAP service provider delivers similar services using WAP and EAP/WX funding. It seems that it would be appropriate for the Department’s WAP office and Xcel to develop procedures to ensure that the programs do not duplicate services. Similarly, the Xcel LI-HES program delivers services to a large number of low-income customers each year and it seems that it would make sense to identify how best to use the information developed in those programs.
- **Communication on Health and Safety Protocols and Costs** – The Department’s WAP office has developed detailed protocols for health and safety assessments, and has developed service delivery guidelines for their agencies. The WAP office also has collected and analyzed detailed information on the cost of required health and safety measures installed by their agencies. Given the importance of health and safety in this sector, it would be appropriate for the Department to communicate those findings to the IOUs and initiate discussions with the IOUs about how to address health and safety issues that represent barriers to the delivery of comprehensive energy efficiency services to low-income households. Most of the health and safety information identifies procedures that must be followed and costs that are incurred to install natural gas measures. It would be useful for the Department’s WAP office to develop

specific guidance on how those protocols affect installation of electric energy efficiency measures.

- Information System – The Department’s WAP office has a database that service delivery agencies use to record information on housing units served by the program. A significant number of households served by WAP also receive funding from the IOUs’ low-income programs. It is likely that there is some opportunity for that database to furnish some useful information to the IOUs about the clients that are served.

These are a few ways that the Department and the IOUs could work together to improve the efficiency and effectiveness of the EAP, WAP, and IOU low-income programs.

8.3.2 Measurement and Evaluation Strategy

Low-income program evaluations have demonstrated the importance of having a systematic measurement and evaluation strategy that develops information on program performance and furnishes ongoing feedback for program improvement. State-level WAP program evaluations have demonstrated significant differences in the energy savings levels achieved by WAP agencies; some agencies achieve savings less than one half the state average while others achieve savings that are more than 50 percent higher than the state average. Analyses of the differences in performance among those agencies demonstrate that a number of factors can lead to those differences in performance, even though the individual agencies are using the same protocols and all have regular monitoring and oversight by the state WAP office. As such, any set of parameter-based estimates of energy savings is vulnerable to understating or overstating the actual accomplishments of the program. We find that direct measurement of energy savings along with detailed observations and inspections are the only reliable way to determine the energy savings from a program and identify specific ways to improve the program outcomes.

In 2006, the Commissioner issued an Order that required IOUs to conduct measurement and verification of the highest priority projects. The targeted projects were mainly C&I projects in which the IOU had invested a substantial amount of funding and which accounted for a substantial fraction of an IOU’s total projected energy savings. Those projects have detailed measurement and verification plans that are reviewed in detail by Department staff.

For other types of programs, the energy savings estimation strategy is for the Department to contract with experts to develop the Minnesota Technical Reference Manual and encourage the IOUs to make use of the TRM for purposes of projecting savings from the measures installed by each program. In general, the IOUs make use of this strategy for projecting energy savings from low-income programs. However, in some cases, the IOUs use the energy savings values output from a low-income measure selection assessment tool (e.g., NEAT) instead of the TRM values.

During in-depth interviews with IOU program managers, they reported that they perceive that that the Department does not require that IOUs implement measurement and verification procedures or conduct evaluations of their low-income programs. While some of the IOUs indicated that they have

conducted at least one program evaluation in the past, only Xcel indicated that they have an ongoing measurement and verification strategy for their low-income programs. Moreover, even the Xcel strategy does not include billing analysis of energy savings.

This approach falls short of low-income program best practices in three ways.

- **Verification of TRM / Energy Savings Inputs** – One important component of an effective measurement and verification strategy is to ensure that the IOUs are collecting the correct information and using it properly in calculating program energy savings. It is common practice in other jurisdictions for third party technical experts to review an IOU's program records to verify that these procedures are being implemented properly. The Department has not required the IOUs to conduct this verification for their low-income programs.
- **Measurement and Verification** – It is common for utilities to specify protocols for third party measurement and verification of measures installed by low-income programs. These procedures might include desk reviews of invoices to ensure that qualified equipment was installed, telephone or email contacts with program participants to verify service delivery and satisfaction, and field visits to document that equipment is installed properly. Xcel has a measurement and verification protocol that includes these program elements. All other IOUs reported that their primary measurement and verification procedures are desk reviews of contractor paperwork.
- **Program Evaluation** – Most low-income programs conduct periodic evaluations that include billing analysis to assess program-level savings rates, as well as other types of analysis procedures that develop information on program implementation procedures or other factors that affect program performance. Such evaluations often find energy savings values that are different from projections and identify specific remediation and performance tracking procedures that improve program performance over time. None of the electric IOUs have conducted this type of evaluation.

It is important for the Department to review the Commissioner Order on measurement and verification procedures and consider whether the intent of the original Order is consistent with the status of measurement and verification procedures for low-income programs.

8.3.3 Program Targeting

Low-income program evaluations have identified some specific targeting procedures that have increased energy savings and other benefits from low-income programs. Electric IOUs have not consistently adopted these targeting strategies.

- **High Users** – Program evaluations have found that high energy users generally have more energy saving opportunities (i.e., more energy efficiency measures are cost-effective to install) and higher energy savings from each measure installed. Implementation of this strategy increases program effectiveness by increasing the measure-level savings and lowering the average fixed costs for delivering each measure. Among the electric IOUs, only Minnesota Power

reported that they look at the overall energy usage, not just the electric usage, to prioritize customers for outreach for their low-income program.

- **Non-energy Benefits** – Recent research has shown that comprehensive low-income energy efficiency programs can deliver substantial benefits in terms of reducing indoor air quality problems that can exacerbate health problems. Programs that target comprehensive service delivery to households with existing health problems can achieve both energy savings and non-energy benefits. None of the electric IOUs are currently targeting these households.
- **Effective Screening Procedures** – It is costly to conduct assessments for the delivery of comprehensive energy services. Many low-income programs have developed procedures that attempt to conduct advance screening to assess the readiness of the household and housing unit to participate in the program, as well as the housing unit's need for program services. The Xcel LI-HES program is a good example of such a program; it furnishes low-cost direct install measures to customers and assesses their potential for more comprehensive services. None of the other electric IOUs reported implementing such procedures.

The electric IOUs are not required to target their programs. More in-depth analysis of the effectiveness of the Xcel LI-HES program for purposes of screening might help the Department and the other IOUs to ascertain whether that program should be replicated.

8.4 Summary of Findings

Our assessment considered whether the IOUs are meeting the explicit requirements associated with the CIP low-income programs, addressing the implicit program objectives, and adopting low-income program best practices.

With respect to explicit program requirements and Department guidance, we find that the IOUs are currently meeting most of the program requirements.

- **Spending Requirement** – All the electric IOUs are meeting or exceeding the low-income spending requirement.
- **Reporting Requirements** – All of the IOUs are filing the required reports with the required information on their low-income programs. Some of the IOUs are not reporting on the number of low-income households that are participating in programs in the residential and business segments.
- **Guidance on Multifamily Buildings** – Xcel serves multifamily buildings with two programs and takes advantage of the program guidance.

With respect to the implicit program objectives, we find that the IOUs have made important progress toward achieving those objectives.

- Serving Low-Income Renters – Xcel has implemented programs that are explicitly designed to serve low-income renters. They allocate as much as 60 percent of their low-income program funds to serving low-income renters.
- Making Use of WAP Protocols – Some IOU programs are implemented by WAP service providers and use WAP protocols, including health and safety protocols and quality control procedures. However, we find that the IOUs are not taking responsibility for verifying that these protocols are followed or determining how to address these issues in their programs that are implemented by other types of service providers.

With respect to low-income program best practices, we find that the IOUs and the Department could improve their performance.

- Program Collaboration – We find that the EAP and WAP offices have developed some procedures that facilitate the implementation of IOU low-income programs. For example, the EAP/WAP/CIP program intake form and procedures are useful for streamlining program intake. However, there are a number of collaboration and coordination opportunities that are not being addressed.
- Measurement and Verification and Program Evaluation – Among the IOUs, only Xcel has an active measurement and verification procedure. None of the IOUs conduct periodic evaluations of their low-income programs. This represents a major barrier to achieving the highest performing low-income programs.
- Program Targeting – None of the IOU programs explicitly target higher users or households for whom the low-income programs would deliver significant non-energy benefits. The Xcel LI-HES program is designed to screen housing units for comprehensive service delivery and might offer a good program model for other electric IOUs to consider.

Overall, the electric IOU programs perform best with respect to the explicit program requirements, have made progress toward achieving implicit program goals, but generally have not adopted low-income program best practices.

9.0 Recommendations

Our assessment finds that the Department and the IOUs are effective in ensuring that the IOU low-income programs meet the explicit low-income program requirements. It further finds that the IOUs have made important progress on implicit program objectives, including delivering program services to low-income renters and in terms of making use of WAP protocols. But, it finds that there are important low-income program best practices that are not followed by the Department or by the IOUs. If the low-income programs are expected to become more effective and efficient, the Department and the IOUs will need to work to consider and implement those best practices through a collaborative effort.

9.1 Explicit Program Requirements

Our primary recommendation with respect to the explicit program requirements is that the Department should work with the IOUs to develop more effective ways of reporting on the number of low-income customers and the number of low-income renters that participate in CIP programs. The rationale for allocating a certain share of CIP program spending on low-income households is that low-income households pay for CIP program services in their rates, but are much less likely to participate and receive benefits from the residential and commercial segment programs. The information provided by CPE in their Triennial Plans and Annual Status Reports furnishes excellent information with which policymakers can examine that rationale for program spending and can consider how to adapt that policy in the future.

We consider this to be a low priority / low effort recommendation. It is important, but is not critical to current program operations. Since CPE has a well-developed procedure for accomplishing this reporting objective, we consider that this would not be expensive or time-consuming to implement.

9.2 Implicit Program Objectives

The IOUs have made good progress toward meeting the implicit program objectives without much guidance from the Department. We recommend that the Department establish policies that clarify the importance of these implicit program objectives and set guidelines that give the IOUs better information on what is required. Specific recommendations include:

- **Counting “Low-Income” Spending** – There has been some ambiguity about what spending should be counted as “low-income” spending. It includes spending on programs in the IOU’s low-income segment. But, should it also include spending on low-income customers and buildings that participate in residential and commercial segment programs. Our recommendation is that “low-income” spending should include any CIP spending in which the customer or building receives special consideration because they are “low-income.” Spending related to a low-income customer who receives a refrigerator rebate that is available to all

residential customers should not be included as “low-income” spending. But, if a low-income building receives an 80 percent rebate while a non-low-income building receives a 40 percent rebate, the program costs should be included in low-income spending calculations.

We consider this to be a moderate priority / moderate effort recommendation. It is moderate priority because it is an outstanding ambiguity that should be resolved. It is moderate effort because, while it is not conceptually challenging, it involves an important policy on which there should be input from all parties.

- Reporting Low-Income Spending Percentage for Low-Income Renters – This analysis has documented that low-income renters represent about 57 percent of low-income households. That percentage is likely to vary by low-income service territory. The Department should develop estimates of the share of households in each IOU’s service territory that are renters and should require IOUs to report what percentage of “low-income” spending is allocated to renters in their Annual Status Report. The Department and the IOUs should review those statistics and consider whether additional initiatives to serve renters would be appropriate.

We consider this to be a high priority / low effort recommendation. It is high priority because the statute clearly identifies low-income renters as an important population and there was considerable discussion of this issue during the 2017-2019 Triennial Plan reviews. It is low effort once the prior issue has been resolved since we perceive that all the data are readily available.

- Program Replication – This analysis found that the IOUs have developed innovative programs that support the implicit program objective of delivering program services to all low-income market segments. IOUs that have not yet implemented those program models should consider whether they are appropriate for their service territory. Specific recommendations include:
 - CPE Non-Profit Affordable Housing and CPE Rental Efficiency – These programs illustrate a different way of serving low-income housing.
 - MERC 4U2 – This program demonstrates a different way of serving low-income households, particularly those that have not previously participated in low-income programs.
 - Xcel LI-HES – This program highlights a different and potentially more efficient way of energy efficiency measures to low-income households.
 - CPE / GPNG Heating System Tune-Up – These programs deliver some relatively low-cost energy savings and are likely to identify some households that are at risk from a malfunctioning furnace.

Before other IOUs replicate these programs, it would be important for the programs to be subjected to enhanced evaluation, measurement, and verification procedures to ensure that the projected savings reported by the sponsoring IOUs are being realized in the practical application of the program. The projected energy savings from the MERC 4U2 program and the Xcel LI-HES program, in particular, are outliers compared to those for similar programs implemented in other service territories that have been subjected to rigorous evaluation, measurement, and verification.

We consider this to be a moderate priority / moderate effort recommendation. It is moderate priority because adoption of these new program models would likely represent an incremental improvement in an IOU's low-income program offerings. It is moderate effort because an IOU would need to get documentation on the program design and consider how to add it to their 2020-2022 Triennial Plan. They also might want to pilot test the concept to see if it is workable in their service territory.

- WAP Protocols – This analysis finds that the Department's WAP program office has developed good-quality protocols for serving low-income households with comprehensive single family programs and that the non-WAP IOU service providers report that they have adopted good-quality protocols. However, it is appropriate for the Department, IOUs, and service providers to work together to ensure that common standards are understood and verified for all service providers. Similar protocols should be developed for other types of programs (e.g., large multifamily building programs). However, it might be appropriate for the IOUs to take the lead on that initiative, since they are working more aggressively in that market segment than is the Department.

We consider this to be a moderate priority / high effort recommendation. It is only moderate priority because the evidence suggests that all service providers are working to deliver good-quality services. It is high effort because the protocols are complex and even the experts do not always agree on appropriate standards.

9.3 Low-Income Program Best Practices

Our assessment found that there are many opportunities for the Department to work with the IOUs to consider ways to operationalize low-income program best practices. Specific recommendations include:

- Communications – Discussions with the Department units have identified a potential strategy for improving communications. It was recommended that each of the Department's low-income program units—CIP, WAP, and EAP—should identify a communications liaison who would have responsibility for identifying common information that should be distributed to all parties that are involved in CIP low-income programs, including IOUs, WAP service providers, and EAP service providers. As those liaisons identify issues, it would be the job of the CIP unit to communicate with IOUs, the WAP unit to communicate with WAP service providers, and the EAP unit to communicate with EAP service providers. One example of communication might be the WAP unit's most recent analysis of the cost of health and safety measures installed by WAP service providers. That would be useful information to disseminate to all parties.

We consider this to be a high priority / moderate effort recommendation. It is high priority because there is important information that is not being communicated. It is moderate effort because, while it does not have to be particularly time-consuming, the Department staff are already fully booked with existing responsibilities. Finding the time to communicate consistently would be a challenge.

- **Program Collaboration** – This study has identified a number of different ways that the Department’s programs and the IOU program could increase collaboration. The Department’s low-income program units and the IOUs should have an ongoing work group that identifies ways to improve collaboration. The highest priority example is improving the collaboration among the Department’s EAP unit, the Department’s WAP unit, and the IOUs in terms of coordinating equipment replacement services. There are three different ways that a low-income customer can get new heating equipment to replace inoperable or unsafe equipment – the ERR program, the WAP program, and the IOU programs. The Department’s EAP and WAP units have recently worked through procedures for coordinating the type of units that will be installed and how the programs will interact. That discussion should be extended to include the natural gas and electric IOU program managers who report that they are struggling with that issue.

We consider this to be the highest priority issue for the Department and the IOUs. It is a high priority / high effort initiative. It is high priority because a failure to effectively coordinate services can result in program inefficiencies in an area where it is critical the very dollar available is spent to maximum effect. It is high effort because the program procedures are complex and must be carefully mapped to identify the optimal approach to coordination. We consider the initiative that was undertaken to establish the Department Guidance on multifamily buildings to be an excellent example of how to work towards this collaboration and, at the same time, demonstrate the potential benefits of undertaking such an initiative.

- **Evaluation, Measurement, and Verification (EM&V)** – The Department and the IOUs need reliable information on low-income program performance to make decisions on how best to allocate program resources to low-income program initiatives. The Department and the IOUs have taken the important first step toward the development of that information. The Department has worked to develop a Technical Reference Manual that serves both low-income and non-low-income programs. The Department also has allowed IOUs to make use of other savings projection procedures that may be appropriate for the special circumstances associated with low-income programs. However, the Department has failed to take the important next steps of establishing standard measurement and verification protocols and specifying the content of and schedule for regular program evaluations. As a result, the IOUs are developing low-income program portfolios with no reliable information on the actual performance of the individual programs. Moreover, the Department itself has not taken responsibility for conducting similar research and evaluation of its own programs. While neighboring states such as Wisconsin, Illinois, and Iowa regularly conduct evaluations of their WAP programs, the Department has not undertaken such an initiative for Minnesota, despite having the eHeat system developed by the EAP unit that gives Minnesota a considerable advantage over those other states in terms of being able to conduct such an evaluation. We recommend that the Department take a leadership role in conducting an evaluation of its own WAP program, and that it work with the IOUs to specify appropriate measurement and verification procedures and evaluation guidelines to ensure that low-income households in Minnesota are being served with the best quality low-income programs, and that resources are directed to those programs that deliver the greatest benefits.

Since about one-half of IOU LI CIP spending is spent on WAP-funded jobs, we recommend that the IOUs participate in designing and funding such an evaluation so that they can get the detailed information that they need to understand the relative savings of LI CIP measures and their interaction with the WAP-funded measures.

We consider this to be a high priority / high effort recommendation. It is high priority because it is the foundation on which good policy is developed. It is high effort because EM&V are complex issues. The Department staff and many of the IOUs have relatively little experience with the standards and procedures. And, each type of program implemented by the IOUs would need different types of EM&V procedures.

- Targeting – The Department and the IOUs should work to develop appropriate targeting procedures. The Department and IOUs can make use of targeting findings from evaluations in other jurisdictions. For example, Minnesota Power is targeting households with high energy usage. However, more intensive targeting analysis cannot be implemented until there are better guidelines on program objectives and until better research has been conducted on the Minnesota IOU programs that demonstrates what kind of targeting would be most beneficial.

In the short run, targeting high usage households and buildings for program services is a high priority / low effort initiative. It is high priority because other evaluations have clearly shown that targeting high usage households and high usage buildings results in higher savings and more cost-effective programs. It is low effort because the eHeat system and utility benchmarking of multifamily buildings furnishes the needed information. In the long run, it is a moderate priority / moderate effort initiative. It is moderate priority because it will be important to take advantage of the findings from Minnesota low-income program EM&V efforts. It will be moderate effort because it will involve review and assessment of EM&V reports.

The Department and the IOUs have worked hard to develop an innovative set of low-income programs that appear to be delivering good-quality services to low-income households in Minnesota. The Department and the IOUs should move forward to implement the recommended initiatives to ensure that the programs are moving in the direction of maximizing the impact of the programs per dollar spent.