

**Low-Income Energy Efficiency Programs:
A Baseline Assessment of Programs
Serving the 51 Largest Cities**

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Abstract

This paper summarizes the findings of a baseline assessment of the electric and natural gas ratepayer-funded energy efficiency programs specifically targeting low-income households in the 51 largest metropolitan statistical areas (MSAs) in the United States. We collected information on low-income program spending, savings, and customers served in 2015, as well as information on program design and delivery (including measures, single versus dual fuel focus, and targeting strategy). Here we give a high-level summary of the efficiency programs that electric and natural gas utilities serving these cities provide to their low-income customers.

Many factors, including the program type and type of households served, can influence the level of spending and savings from low-income programs. Overall, we found that 49 MSAs were served by a low-income electric utility program and 32 were served by a low-income natural gas efficiency program. In total, 13 MSAs had an electric and natural gas utility partner by providing dual fuel low-income programs. The average spending and savings for electric utility low-income programs was \$8,152,908 and 6,734 MWh, with spending and savings normalized to an average of \$22.37 and 22 kWh per estimated low-income customer and \$1,525 and 1,371 kWh per low-income program participant. For natural gas utilities, total spending and savings for utility low-income programs averaged \$6,731,779 and 553,600 therms, with an average of \$22.64 and 3.1 therms per estimated low-income customer and \$1,940.46 spent and 145 therms saved per low-income program participant.

We also analyzed elements of program design and delivery, such as program measures, enrollment streamlining, targeting households, and coordination with the federal Weatherization Assistance Program (WAP). The low-income programs we reviewed typically include lighting, air sealing, and insulation measures, and less commonly include health and safety measures and smart thermostats. Most low-income programs do not target specific households, but those that do tend to focus on high energy users and elderly households. To streamline program enrollment to reduce administrative costs, many utilities use income-eligibility criteria from federal, state, and other utility programs. Approximately half of the electric and natural gas programs coordinate with WAP, indicating significant potential for utilities to increase their coordination with this federal program.

While this paper provides an overview of low-income energy efficiency programs across the country, more research is needed to determine what elements of programs and policies lead to high energy savings and other successful outcomes. ACEEE will continue to research low-income energy efficiency programs and policies to better determine best practices.

Introduction

On average, low-income households spend three times more of their income on energy bills than higher income households (Drehobl and Ross 2016). Inefficient housing stock factors into these high energy burdens, and research shows that investing in energy efficiency can reduce the burdens for low-income households by an average of 25% (Drehobl and Ross 2016). In 2015, 33% of households had incomes at or below 200% of the federal poverty level (FPL), with these households more vulnerable to high energy burdens (US Census Bureau 2015). According to the 2009 National Assistance Survey, high home energy costs resulted in numerous negative impacts on low-income households, with at least one-third of them reporting difficulty in making a rent payment or accessing food or medical care (NEADA 2010).

The upfront costs for efficiency upgrades are disproportionately burdensome for low-income households, making financial incentives and technical assistance important to help these households implement efficiency upgrades. Energy efficiency programs targeting low-income customers present a key opportunity to help households save energy while also reducing high energy burdens. Most major metropolitan areas in the country have utility energy efficiency programs specifically designed to target low-income households.¹ Other weatherization programs can complement these programs to provide energy efficiency and weatherization services to low-income households.² The federal Weatherization Assistance Program (WAP) provides funds to each state to assist in weatherization for homes of low-income residents.

This paper explores the role of utility low-income programs in reducing energy burdens and reaching households. Although most of the largest cities have programs, they vary greatly in design and implementation. Here, we provide a baseline assessment of utilities' low-income program achievements in the largest urban areas, along with current trends in the field and areas of opportunity to improve low-income program design and delivery.

Low-Income Baseline Project Scope and Methodology

In this paper, we summarize the findings of our assessment of program design, delivery, spending, and savings from utility energy efficiency programs targeted specifically at low-income customers in the 51 largest metropolitan statistical areas (MSAs) in the country. Although more than one utility serves some MSAs, our analysis assesses only the one electric and one natural gas utility that serves the most customers in each MSA.³ This

¹ These utility energy efficiency programs are often called *customer-funded* or *ratepayer-funded* programs, as they are paid for through utility rates on customers' bills. Utilities sometimes administer these programs through state entities or other statewide program administrators. The term *utility programs* throughout this paper refers to all types of programs funded through utility rates.

² Weatherization programs are energy efficiency programs that tend to focus on building envelope improvements (e.g., insulation and air sealing) and sometimes on heating and cooling system improvements, while energy efficiency programs include measures beyond these improvements such as efficient lighting and efficient appliances.

³ Based on this methodology, in five cases where the electric utility is dual fuel, we assess a different gas utility. These cases include Boston with Eversource Energy and National Grid, Chicago with ComEd and Peoples Gas, Hartford with Eversource and Connecticut Natural Gas, Minneapolis with Xcel Energy and CenterPoint Energy,

assessment does not include utility residential programs that do not specifically target low-income customers, nor does it include federally funded programs such as WAP or the Low-Income Home Energy Assistance Program (LIHEAP).

For this study, we define *low-income* according to each utility's definition for its low-income program eligibility. These definitions are often income-based at the household level – for example, 60% of area median income (AMI) or 200% of the FPL – but some utilities use a neighborhood approach, identifying all households in a census block as eligible. All data referenced in this paper, including additional program-specific details, other policy information, and data sources, can be found in ACEEE's online State and Local Policy Database at database.aceee.org.⁴

For this assessment, we collected data on low-income programs from a data request sent directly to the electric and natural gas utility serving the majority of residential customers in the 51 largest MSAs. We sent the data request to 73 electric and natural gas utilities, and we received responses from 62 of them. We supplemented this information with data from utility demand-side management reports, annual reports, and website information. For spending and savings, we collected data from 2015 programs, the most recent year with complete data available. For program design and implementation, we collected data on the current programs run by each utility or statewide administrator.

STUDY LIMITATIONS

For this analysis, we relied on data request responses from low-income program managers at utilities as our primary data set, and supplemented this information with utility demand-side management reports and annual reports. We did not verify the information provided in the responses. Therefore, the data provided in the data requests may not match data provided through other utility reports. In cases where the data provided in the data request and reports differed, we defaulted to the data request data.

This assessment was also limited to data that are publicly available or provided through the data requests. We were not able to assess actual implementation of programs; instead, we assess elements of the design and implementation as they are available in reports or provided to us through data requests. The most recent quantitative data available were for 2015. Since programs may have changed since then, those data may not match the 2016–2017 program designs illustrated in this report.

We were unable to collect data on program participation for eight electric and four natural gas utilities. In these cases, we were unable to evaluate the savings-per-program-participant metric, as seen in tables A2 and A3 in the appendix. Additionally, although we present the data by MSA, all data for each utility in this paper reflect low-income programs that may be available across the entire utility service area, rather than only in the MSA.

and New York City with ConEd and National Grid. In these cases, to manage the project's scope, we did not assess the natural gas savings from the dual fuel utilities (i.e., Eversource, ConEd, ComEd, and Xcel).

⁴ The State and Local Policy Database contains all the data used to score the ACEEE's *State Energy Efficiency Scorecards* and *City Energy Efficiency Scorecards*, and is updated annually or biannually.

Low-Income Program Overview

The majority of utilities serving the largest MSAs administer energy efficiency programs that target low-income customers. Of the 51 analyzed MSAs, 49 have an electric utility administering low-income efficiency programs, and 32 of those 49 MSAs also have a natural gas utility administering a low-income program. Overall, 63% of the included MSAs have both electric and natural gas low-income efficiency programs. Based on available data, we found no evidence of low-income efficiency programs sponsored by electric or natural gas utilities in Birmingham and Nashville.

Figure 1 shows the 51 MSAs included in this assessment and whether they have low-income energy efficiency programs run by both electric and natural gas utilities, only electric utilities, or neither utility.

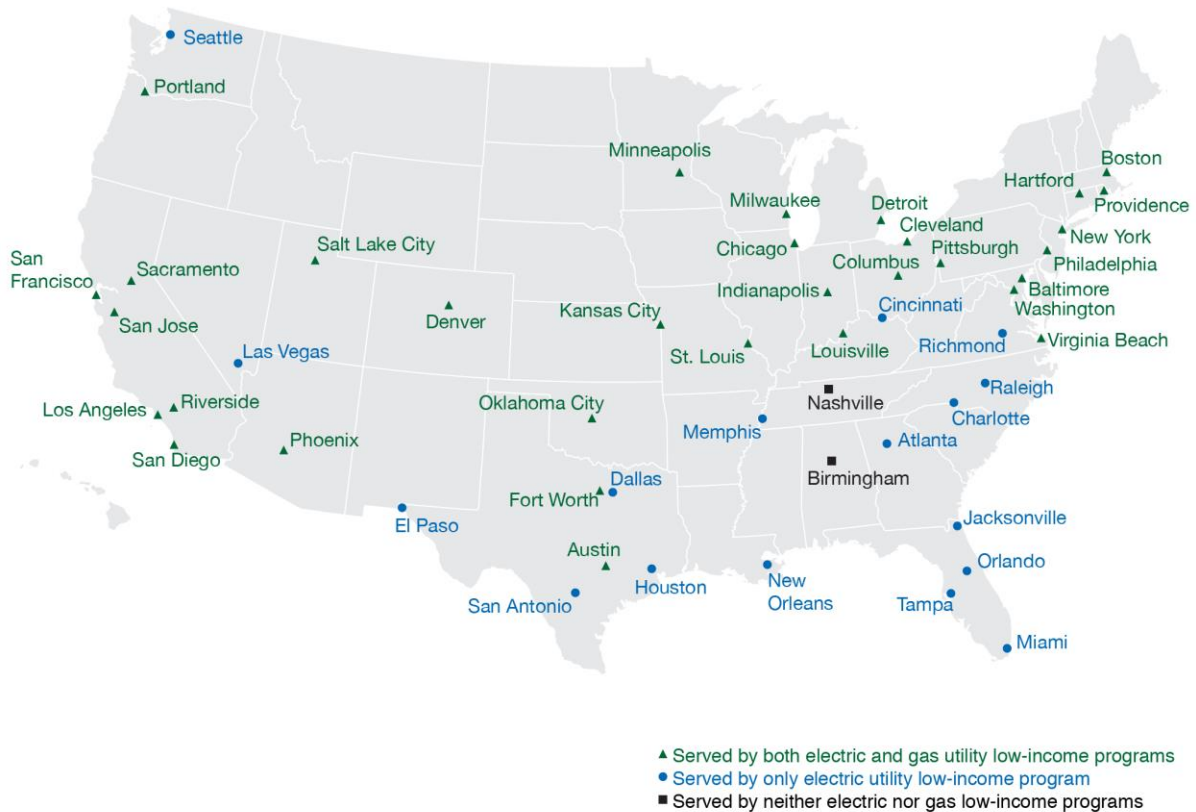


Figure 1. The 51 largest MSAs included in the low-income baseline assessment

Low-Income Program Spending

Electric and natural gas utility spending on low-income programs varied greatly. In this section, we examine low-income program spending overall, and we also look at spending in each utility’s service territory per low-income customer and per program participant. These metrics help us examine the resources utilities are putting forth to reach low-income customers with efficiency; they also provide more insight into how much funding they offer relative to their customer base and program participation.

TOTAL SPENDING

This section chronicles total spending by utility on low-income programs in 2015. Table 1 includes data on each utility’s low-income program spending and total residential spending in 2015. Data for this table were collected through the data request and the 2017 ACEEE City Energy Efficiency Scorecard report. These values include all spending by the utility in its service territory in each state, not just its spending within the MSA.

Table 1. Utility electric and natural gas low-income efficiency program spending and total residential program spending in 2015 by MSA

City & state		Electric utility	2015 low-income program spending	2015 total energy efficiency program spending*	Natural gas utility	2015 low-income program spending	2015 total energy efficiency program spending
Atlanta	GA	Georgia Power*	\$2,000,000	\$54,646,946	Atlanta Gas Light	N/A	N/A
Austin	TX	Austin Energy	\$2,125,667	\$21,786,247	Texas Gas Service	\$278,805	\$3,068,082
Baltimore	MD	BG&E*	\$13,760,000	\$132,937,516	BG&E*	\$2,054,072	\$15,538,083
Birmingham	AL	Alabama Power	N/A	\$4,604,000	Alagasco	N/A	N/A
Boston	MA	Eversource*	\$25,387,428	\$273,305,402	National Grid (Boston Gas Co. & Colonial Gas Co.)	\$22,629,186	\$104,899,957
Charlotte	NC	Duke Energy Carolinas	\$2,000,000	\$57,211,973	Piedmont Natural Gas	N/A	N/A
Chicago	IL	ComEd*	\$7,301,813	\$207,348,389	Peoples Gas	No data	\$14,387,769
Cincinnati	OH	Duke Energy Ohio	\$708,000	\$31,349,457	Duke Energy Ohio	N/A	N/A
Cleveland	OH	First Energy (Cleveland Electric Illuminating)**	\$6,562,783	\$23,413,091	Dominion East Ohio	No data	\$9,300,000
Columbus	OH	American Electric Power	\$6,651,548	\$65,147,500	Columbia Gas of Ohio	\$10,684,168	\$27,686,728
Dallas, Fort Worth	TX	ONCOR*	\$12,981,305	\$61,404,147	ATMOS Energy (Fort Worth only)*	\$423,504	\$1,168,250
Denver	CO	Xcel (Public Service Co. of CO)*	\$3,087,697	\$77,793,152	Xcel (Public Service Co. of CO)*	\$3,174,843	\$16,055,359
Detroit	MI	DTE Energy*	\$7,400,000	\$94,500,000	DTE Energy*	\$5,280,000	\$29,280,000
El Paso	TX	El Paso Electric*	\$651,474	\$4,768,857	Texas Gas Service	N/A	N/A
Hartford	CT	Eversource	\$17,795,096	\$145,547,869	Connecticut Natural Gas	\$4,533,997	\$13,305,901
Houston	TX	CenterPoint Energy*	\$3,777,530	\$41,224,919	CenterPoint Energy	N/A	N/A
Indianapolis	IN	Indianapolis Power & Light	\$482,626	\$16,431,371	Citizens Energy Group*	\$432,000	\$4,373,025
Jacksonville	FL	JEA	\$650,000	\$5,554,629	TECO Peoples Gas	N/A	N/A
Kansas City	MO	KCP&L*	\$1,664,079	\$21,358,079	Missouri Gas*	\$770,000	\$2,598,415
Las Vegas	NV	NV Energy	No data	\$22,004,108	Southwest Gas	N/A	N/A
Los Angeles	CA	LADWP	\$7,494,076	\$73,239,817	SoCal Gas*	\$74,800,000	\$144,342,878
Louisville	KY	Louisville Gas & Electric	\$1,618,707	\$16,218,000	Louisville Gas & Electric	\$1,207,173	N/A
Memphis	TN	Memphis Light, Gas & Water*	\$337,500	\$736,840	Memphis Light, Gas & Water	N/A	N/A
Miami	FL	Florida Power & Light Co.*	\$89,000	\$124,259,000	Florida City Gas	N/A	N/A
Milwaukee	WI	We Energies*	\$18,264,184	\$54,636,478	We Energies*	\$8,443,151	\$19,311,986
Minneapolis	MN	Xcel (Northern States Power)*	\$2,375,360	\$93,761,136	CenterPoint Energy*	\$2,665,523	\$28,559,141
Nashville	TN	Nashville Electric Service	N/A	\$731,300	Piedmont Natural Gas	N/A	N/A
New Orleans	LA	Entergy New Orleans	\$743,327	\$5,648,627	Entergy New Orleans	N/A	N/A

City & state		Electric utility	2015 low-income program spending	2015 total energy efficiency program spending*	Natural gas utility	2015 low-income program spending	2015 total energy efficiency program spending
New York City	NY	ConEdison/NYSERDA*	\$4,933,450	\$93,117,311	National Grid (Brooklyn Union Gas)/NYSERDA*	\$7,642,304	\$26,904,888
Oklahoma City	OK	Oklahoma Gas & Electric*	\$5,936,312	\$26,614,506	Oklahoma Natural Gas Co.	\$252,900	\$11,526,722
Orlando	FL	Orlando Utilities Commission*	\$103,801	\$1,540,799	TECO Peoples Gas	N/A	N/A
Philadelphia	PA	PECO (Exelon)*	\$13,033,000	\$81,685,000	PGW*	\$7,913,908	\$10,629,483
Phoenix	AZ	Arizona Public Service	\$2,274,342	\$64,343,377	Southwest Gas*	\$408,921	\$3,610,414
Pittsburgh	PA	Duquesne Light Co***	\$1,665,000	\$18,229,000	Peoples Natural Gas	\$2,141,694	No data
Portland	OR	Portland General Electric Co.*	\$6,801,565	\$82,387,945	NW Natural*	\$1,246,030	\$19,799,047
Providence	RI	National Grid RI (Narragansett Electric)*	\$10,105,000	\$92,956,000	National Grid RI (Narragansett Electric)*	\$5,022,000	\$24,539,400
Raleigh	NC	Duke Energy Progress	\$1,500,000	\$48,746,226	PSNC Energy	N/A	N/A
Richmond	VA	Dominion Virginia Power (Virginia Electric P&L)	No data	\$3,057,000	Richmond Dept. of Public Utilities	N/A	N/A
Riverside	CA	City of Riverside Public Service	\$57,000	\$3,277,000	SoCal Gas*	\$74,800,000	\$144,342,878
Sacramento	CA	SMUD	No data	\$36,660,884	PG&E*	\$24,619,562	\$103,201,489
Salt Lake City	UT	Rocky Mountain Power*	\$63,903	\$56,218,903	Questar Gas	\$673,123	\$24,187,461
San Antonio	TX	CPS Energy (City of San Antonio)	\$21,803,784	\$44,057,679	CPS Energy	N/A	N/A
San Diego	CA	San Diego Gas & Electric*	\$8,879,917	\$114,152,069	San Diego Gas & Electric*	\$8,475,680	\$17,983,099
San Francisco, San Jose	CA	PG&E*	\$112,155,783	\$470,140,116	PG&E	\$24,619,562	\$103,201,489
Seattle	WA	Seattle City Light*	\$3,539,243	\$48,852,623	Puget Sound Energy****	N/A	\$13,094,000
St. Louis	MO	AmerenUE	\$3,400,000	\$60,000,000	Laclede Gas*	\$1,420,424	\$3,362,422
Tampa	FL	Tampa Electric Co	\$3,994,280	\$27,502,000	TECO Peoples Gas	N/A	N/A
Virginia Beach	VA	Dominion Virginia Power (Virginia Electric P&L)	No data	\$3,057,000	Virginia Natural Gas (AGL Resources)*	\$37,875	\$376,533
Washington	DC	PEPCO/DCSEU*	\$4,849,467	\$18,149,974	Washington Gas/DCSEU*	\$923,708	\$6,319,472

N/A (not applicable) indicates utilities that do not have a low-income efficiency program. *No data* indicates that we were unable to determine spending data. Spending on low-income programs and total utility spending includes spending across the whole utility service territory, not just in the boundaries of the city. * The utility reported its low-income spending separately from its residential and commercial energy efficiency spending. We added low-income spending into the 2015 total energy efficiency spending. ** First Energy in Cleveland's spending and revenues are from 2013, 2014, and 2015, as spending could not be broken down for only 2015. *** Duquesne Light data are from June 2015 to May 2016. **** Puget Sound Energy does offer a low-income natural gas program, but this program is not available to Seattle residents.

SPENDING PER LOW-INCOME CUSTOMER

Utilities have many more low-income customers in their customer base than they are able to serve with their low-income program offerings. In this section, we present spending on low-income programs, normalized by an estimated number of low-income customers in each utility's service territory. We used data from the Energy Information Administration form EIA-861 database to calculate total residential customers for each utility; we then used a

poverty estimate to calculate the number of low-income customers in the service territory. To calculate poverty, we used the US Census Bureau’s 2015 estimate of the percentage of each state’s population at or below 200% of the FPL. For municipally owned utilities, we used Census poverty data at the MSA level. Figures 2 and 3 illustrate how much each utility spends per estimated low-income customer in its service territory.

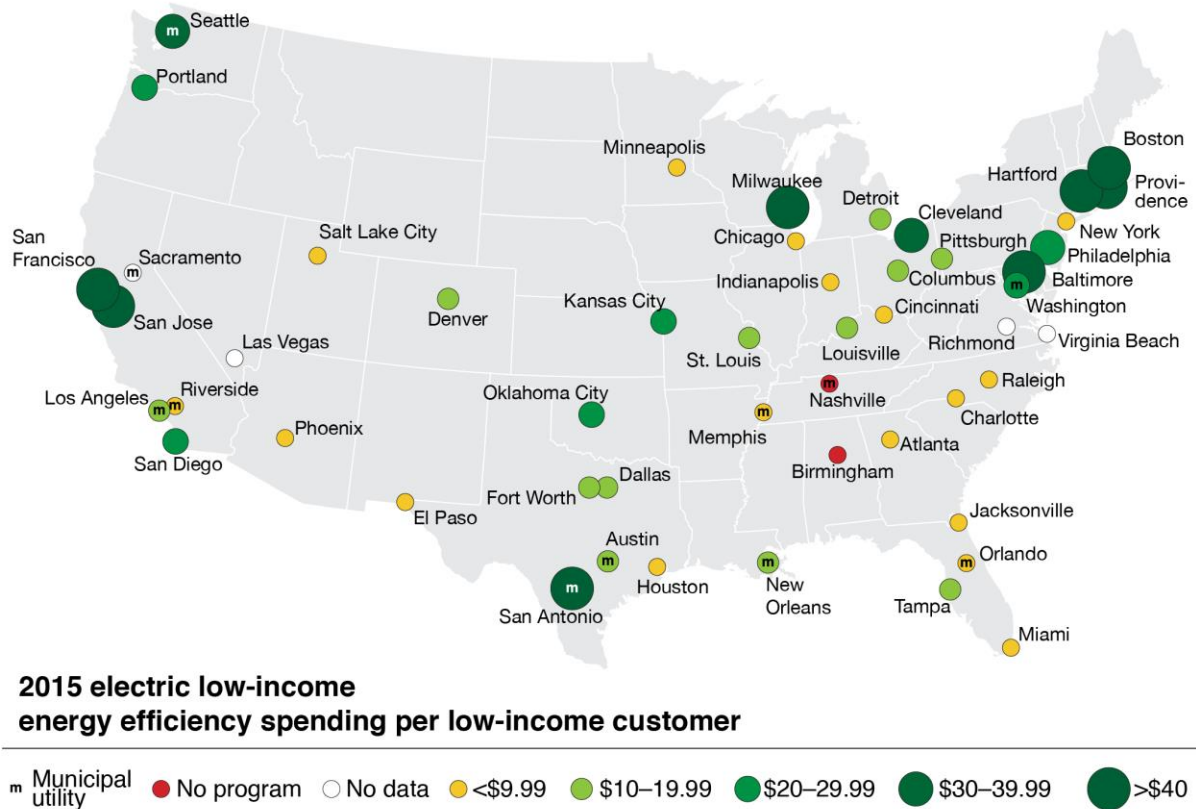


Figure 2. Electric low-income energy efficiency program spending by estimated number of low-income customers in each utility’s service territory in 2015

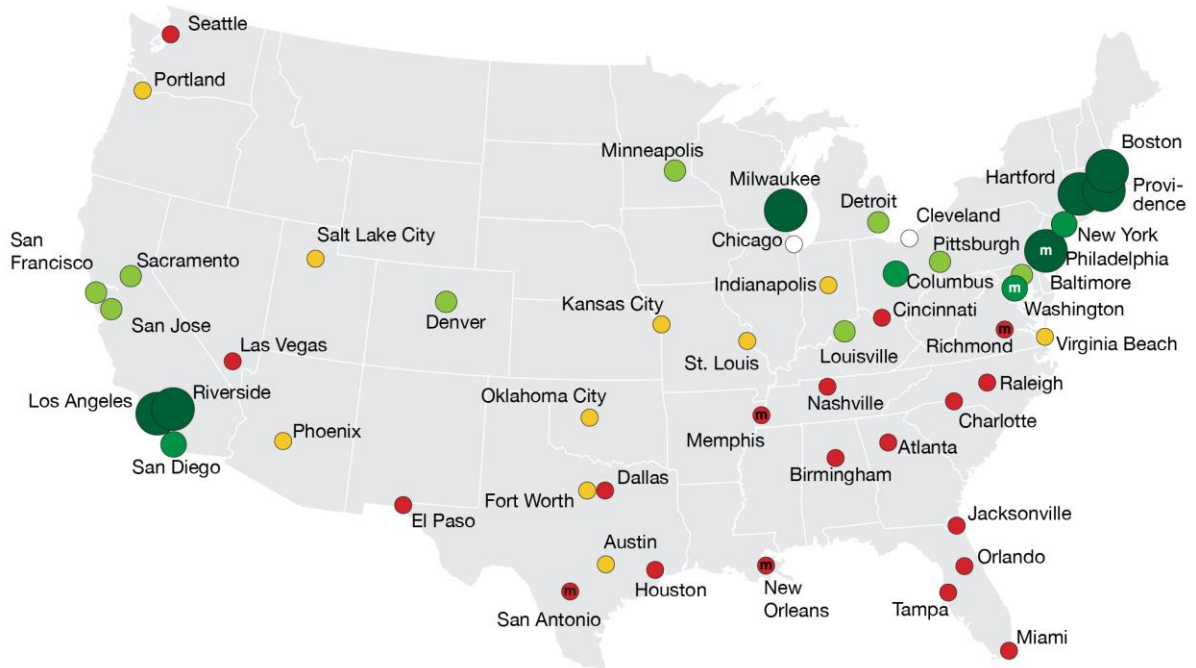
To get a sense of the range of spending per low-income customer among the utilities, table 2 includes the electric utilities with the five highest and five lowest spending per estimated low-income customer. In Appendix A, table A1 has information on how we calculated each utility’s estimated low-income customer base, while tables A2 and A3 have information on spending per low-income customer values for each utility.

Table 2. Five highest and lowest electric utility 2015 spending on low-income energy efficiency programs by estimated number of low-income customers

Electric utility	City	State	2015 spending per low-income customer
Eversource Energy	Boston	MA	\$91.81
CPS Energy	San Antonio	TX	\$88.84
Narragansett (National Grid)	Providence	RI	\$80.15
PG&E	San Francisco & San Jose	CA	\$71.56

Electric utility	City	State	2015 spending per low-income customer
Eversource Energy	Hartford	CT	\$69.21
Memphis Light, Gas & Water	Memphis	TN	\$2.37
City of Riverside Public Service	Riverside	CA	\$1.49
Orlando Utilities Commission	Orlando	FL	\$1.40
Rocky Mountain Power	Salt Lake City	UT	\$0.30
Florida Power and Light	Miami	FL	\$0.06

In addition, we found no evidence of low-income programs in Birmingham and Nashville and therefore no spending.



2015 natural gas low-income energy efficiency spending per low-income customer

m Municipal utility ● No program ○ No data ● <\$9.99 ● \$10–19.99 ● \$20–29.99 ● \$30–39.99 ● >\$40

Figure 3. Natural gas low-income energy efficiency program spending by estimated number of low-income customers in each utility's service territory in 2015

Table 3 shows the five highest and five lowest spending per estimated low-income customer values for natural gas utilities in 2015.

Table 3. Five highest and lowest gas utility 2015 spending on low-income energy efficiency programs by estimated number of low-income customers

Natural gas utility	City	State	2015 spending per low-income customer
National Grid	Boston	MA	\$139.01
Connecticut Natural Gas	Hartford	CT	\$126.44
Narragansett (National Grid)	Providence	RI	\$73.28
We Energies	Milwaukee	WI	\$66.66
PGW	Philadelphia	PA	\$62.18
Texas Gas Service	Austin	TX	\$1.31
Southwest Gas	Phoenix	AZ	\$1.09
Oklahoma Natural Gas Co.	Oklahoma City	OK	\$0.82
Atmos Energy	Fort Worth	TX	\$0.69
Virginia Natural Gas (AGL Resources)	Virginia Beach	VA	\$0.51

In addition, 21 cites have no gas utility programs and hence no gas utility spending.

SPENDING PER PROGRAM PARTICIPANT

Electric and natural gas programs both varied greatly by their spending per program participant (see Appendix A, tables A2 and A3). These values include how much the utility spent per participating household across its low-income program portfolio. Spending per program participant varies greatly depending on the type of program and the type of building (e.g., single family or multifamily buildings). Whole building retrofits require higher spending per household than direct-installation programs, which supply energy-saving measures such as light bulbs and air sealing and may reach many more households. Other factors such as climate zones can impact typical savings per participant for certain types of programs, such as those that affect heating and cooling systems. In this section, we do not identify the type of program each utility runs (e.g., direct install or whole building retrofit), but we do calculate spending per program participant based on the total spending on low-income programs and the number of households served in 2015.

Table 4 shows the five utilities with the highest and the five with the lowest spending per program participant, illustrating the range of spending values among utilities. Tables A2 and A3 in Appendix A show spending per program participant values, as well as the number of program participants and overall spending for each utility.

Table 4. Five highest and lowest electric utility 2015 spending per low-income efficiency program participant

Electric utility	City	State	2015 spending per program participant
Baltimore Gas & Electric	Baltimore	MD	\$6,054
We Energies	Milwaukee	WI	\$5,928
CPS Energy	San Antonio	TX	\$5,382
Austin Energy	Austin	TX	\$4,088
Portland General Electric Co.	Portland	OR	\$3,927
Duke Energy Carolinas	Charlotte	NC	\$318
Rocky Mountain Power	Salt Lake City	UT	\$209
DTE Energy	Detroit	MI	\$187
Duquesne Light Co.	Pittsburgh	PA	\$62
Florida Power and Light	Miami	FL	\$45

In addition, we found no evidence of low-income programs in Birmingham and Nashville and therefore no spending.

For the 38 electric programs for which we collected spending and program participant data, the average utility spends \$1,525 per program participant. The programs with the highest spending per customer served provided whole-building retrofit programs to their low-income customers, which may account for the high spending per household. For example, Austin Energy's weatherization program contains a comprehensive set of whole-building weatherization measures including insulation, air sealing, window air conditioner replacement, health and safety elements, and high-efficiency lighting. In contrast, the programs with the lowest spending per household served tend to provide low-cost direct install measures. For example, DTE Energy has a variety of low-income programs, which include whole building retrofit and direct install programs. Its Home Energy Consultation program reached 27,000 households with direct install measures in 2015. When this direct install program is averaged with its other low-income programs, spending per household is much lower than in cases where utilities run only a whole building retrofit program.

Table 5 illustrates the range of spending values for natural gas utilities on their low-income programs by program participant. For the 23 natural gas programs for which spending and program participant data were available, the average program spent approximately \$1,940 per household.

Table 5. Five highest and lowest natural gas utility 2015 spending per low-income efficiency program participant

Electric utility	City	State	2015 spending per program participant
NW Natural	Portland	OR	\$5,394
Peoples Natural Gas	Pittsburgh	PA	\$5,275
Columbia Gas of Ohio	Columbus	OH	\$5,124
Citizens Energy Group	Indianapolis	IN	\$4,966

Electric utility	City	State	2015 spending per program participant
National Grid	Boston	MA	\$3,105
Louisville Gas & Electric	Louisville	KY	\$639
Laclede Gas	St. Louis	MO	\$583
San Diego Gas & Electric	San Diego	CA	\$419
Xcel (Public Service Co. of CO)	Denver	CO	\$343
MichCon Gas (DTE Energy)	Detroit	MI	\$133

In addition, 21 cites have no gas utility programs and hence no gas utility spending.

Low-Income Program Savings

Low-income efficiency programs are designed with goals beyond saving energy; many programs include nonenergy-related measures such as water conservation and health and safety measures. Even so, low-income programs that achieve high energy savings at low cost can be more successful in reducing high household energy burdens and providing benefits to participating households.

TOTAL SAVINGS

This section chronicles total savings on low-income programs, by utility. Table 6 includes data on low-income program savings and total residential savings for each utility in 2015. Data for this table were collected through the data request and the 2017 ACEEE City Energy Efficiency Scorecard report. These values include all savings by the utility in its service territory in each state, not just its savings within the MSA.

Table 6. Electric and natural gas utility low-income energy efficiency program savings and total residential program savings in 2015 by MSA

City & state	Electric utility	2015 low-income program savings (MWh)	2015 total residential program savings (MWh)	Natural gas utility	2015 low-income program savings (MMtherms)	2015 total residential program savings (MMtherms)
Atlanta GA	Georgia Power	No data	309,275	Atlanta Gas Light	N/A	No data
Austin TX	Austin Energy	568	123,169	Texas Gas Service	No data	0.15
Baltimore MD	BG&E	2,521	386,505	BG&E	0.30	0.72
Birmingham AL	Alabama Power	N/A	10,422	Alagasco	N/A	No data
Boston MA	Eversource	23,490	730,731	National Grid (Boston Gas Co. & Colonial Gas Co.)	1.18	14.89
Charlotte NC	Duke Energy Carolinas	2,669	473,792	Piedmont Natural Gas	N/A	No data
Chicago IL	ComEd	8,617	1,122,656	Peoples Gas	No data	8.14
Cincinnati OH	Duke Energy Ohio	1,974	181,859	Duke Energy Ohio	N/A	0.00
Cleveland OH	First Energy (Cleveland Electric Illuminating)	9,155*	146,342	Dominion East Ohio	No data	No data
Columbus OH	American Electric Power	7,440	460,706	Columbia Gas of Ohio	0.66	8.40
Dallas, Fort Worth TX	ONCOR	23,044	166,594	ATMOS Energy (Fort Worth only)	No data	6.00
Denver CO	Xcel (Public Service Co. of CO)	6,503	405,558	Xcel (Public Service Co. of CO)	0.60	5.98
Detroit MI	DTE Energy	24,840	620,700	DTE Energy	1.10	14.80
El Paso TX	El Paso Electric	1,480	22,283	Texas Gas Service	N/A	No data

City & state		Electric utility	2015 low-income program savings (MWh)	2015 total residential program savings (MWh)	Natural gas utility	2015 low-income program savings (MMTherms)	2015 total residential program savings (MMtherms)
Hartford	CT	Eversource	14,098	334,298	Connecticut Natural Gas	0.45	1.71
Houston	TX	CenterPoint Energy	3,843	155,048	CenterPoint Energy	N/A	No data
Indianapolis	IN	Indianapolis Power & Light	1,149	133,929	Citizens Energy Group	No data	1.55
Jacksonville	FL	JEA	862	33,754	TECO Peoples Gas	N/A	No data
Kansas City	MO	KCP&L	No data	69,108	Missouri Gas	No data	2.83
Las Vegas	NV	NV Energy	No data	131,029	Southwest Gas	N/A	1.60
Los Angeles	CA	LADWP	6,655	336,760	SoCal Gas	1.60	18.75
Louisville	KY	Louisville Gas & Electric	3,884	52,296	Louisville Gas & Electric	0.58	No data
Memphis	TN	Memphis Light, Gas & Water	No data	2,206	Memphis Light, Gas & Water	N/A	No data
Miami	FL	Florida Power & Light Co.	104	114,523	Florida City Gas	N/A	No data
Milwaukee	WI	We Energies	3,726	207,961	We Energies	0.78	17.44
Minneapolis	MN	Xcel (Northern States Power)	2,597	379,424	CenterPoint Energy	0.37	16.00
Nashville	TN	Nashville Electric Service	N/A	4,198	Piedmont Natural Gas	N/A	No data
New Orleans	LA	Entergy New Orleans	1,335	20,349	Entergy New Orleans	N/A	No data
New York City	NY	ConEdison/NYSERDA	7,883	390,201	National Grid (Brooklyn Union Gas)/NYSERDA	1.07	3.53
Oklahoma City	OK	Oklahoma Gas & Electric	11,900	83,616	Oklahoma Natural Gas Co.	0.09	2.76
Orlando	FL	Orlando Utilities Commission	72	16,672	TECO Peoples Gas	N/A	No data
Philadelphia	PA	PECO (Exelon)	14,508	251,370	PGW	0.65	0.84
Phoenix	AZ	Arizona Public Service	1,793	419,737	Southwest Gas	0.01	1.21
Pittsburgh	PA	Duquesne Light Co	5,453	87,543	Peoples Natural Gas	No data	No data
Portland	OR	Portland General Electric Co.	3,874	279,129	NW Natural	0.05	5.92
Providence	RI	National Grid RI (Narragansett Electric)	6,587	204,408	National Grid RI (Narragansett Electric)	0.32	4.20
Raleigh	NC	Duke Energy Progress	2,896	322,655	PSNC Energy	N/A	No data
Richmond	VA	Dominion Virginia Power (Virginia Electric P&L)	777	83,383	Richmond Dept. of Public Utilities	N/A	No data
Riverside	CA	City of Riverside Public Service	93	15,791	SoCal Gas	1.60	18.75
Sacramento	CA	SMUD	No data	146,937	PG&E	2.21	19.35
Salt Lake City	UT	Rocky Mountain Power (PacifiCorp)	246	254,000	Questar Gas	0.10	7.62
San Antonio	TX	CPS Energy (City of San Antonio)	13,759	101,209	CPS Energy	N/A	No data
San Diego	CA	San Diego Gas & Electric (SDG&E)	3,760	264,350	San Diego Gas & Electric (SDG&E)**	0.25	0.35
San Francisco, San Jose	CA	PG&E	31,960	1,214,273	PG&E	2.21	19.35
Seattle	WA	Seattle City Light	5,097	146,017	Puget Sound Energy	N/A	3.24
St. Louis	MO	AmerenUE	4,700	460,562	Laclede Gas	No data	0.70
Tampa	FL	Tampa Electric Co	4,666	31,880	TECO Peoples Gas	N/A	No data
Virginia Beach	VA	Dominion Virginia Power (Virginia Electric P&L)	777	83,383	Virginia Natural Gas (AGL Resources)	0.004	0.07
Washington	DC	PEPCO/DCSEU	4,716	53,724	Washington Gas/DCSEU	0.23	0.94

N/A (not applicable) indicates utilities that do not have a low-income efficiency program. *No data* indicates that we were unable to determine savings data. Spending on low-income savings and total utility savings include savings across the whole utility service territory, not just in the boundaries of the city. * First Energy in Cleveland's spending is consolidated for 2013-2015. ** SDG&E reported low-income natural gas savings separately from total residential and commercial savings. In order to calculate total savings with low-income savings, we added these values.

SAVINGS PER LOW-INCOME CUSTOMER

This section uses the same methodology as the Spending per Low-Income Customer section to calculate savings per low-income customer in the utility’s service territory (figure 4). Of the electric utilities in the study, 41 provided 2015 savings values from their low-income efficiency programs.

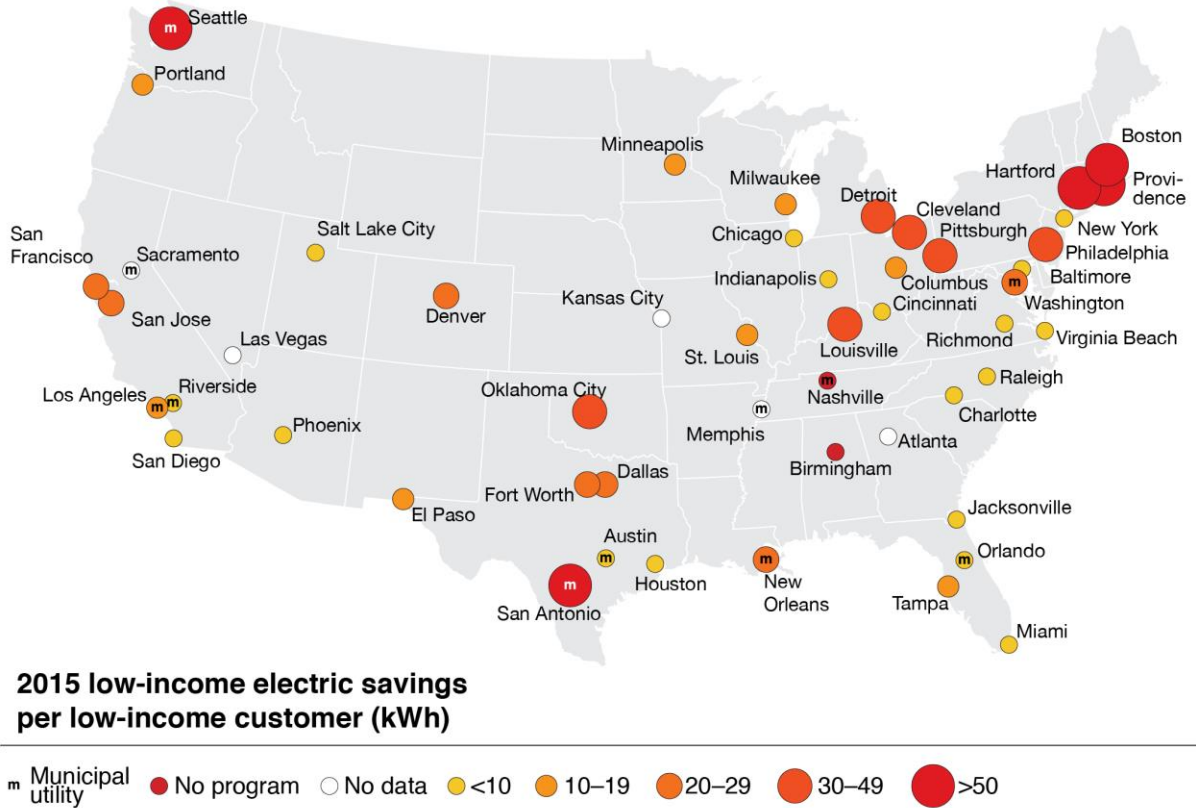


Figure 4. 2015 electric low-income savings by estimated number of low-income customers in each utility’s service territory

To represent the range of utilities’ low-income program savings, Table 7 shows the five highest and lowest savings per estimated low-income customer, as reflected in the map above.

Table 7. Five highest and lowest electric utility savings (kWh) on low-income energy efficiency programs by estimated number of low-income customers in 2015

Electric utility	City	State	2015 savings per low-income customer (kWh)
Eversource	Boston	MA	84.95
Seattle City Light	Seattle	WA	65.07
CPS Energy	San Antonio	TX	56.06
Eversource	Hartford	CT	54.83
Narragansett (National Grid)	Providence	RI	52.25

Electric utility	City	State	2015 savings per low-income customer (kWh)
City of Riverside Public Service	Riverside	CA	2.44
Dominion Virginia Power	Richmond	VA	1.29
Rocky Mountain Power	Salt Lake City	UT	1.15
Orlando Utilities Commission	Orlando	FL	0.97
Florida Power and Light	Miami	FL	0.07

Figure 5 shows the relative savings per low-income customer in each natural gas utility’s service territory. Of the natural gas utilities in this study, 20 provided savings values from their 2015 low-income efficiency programs.

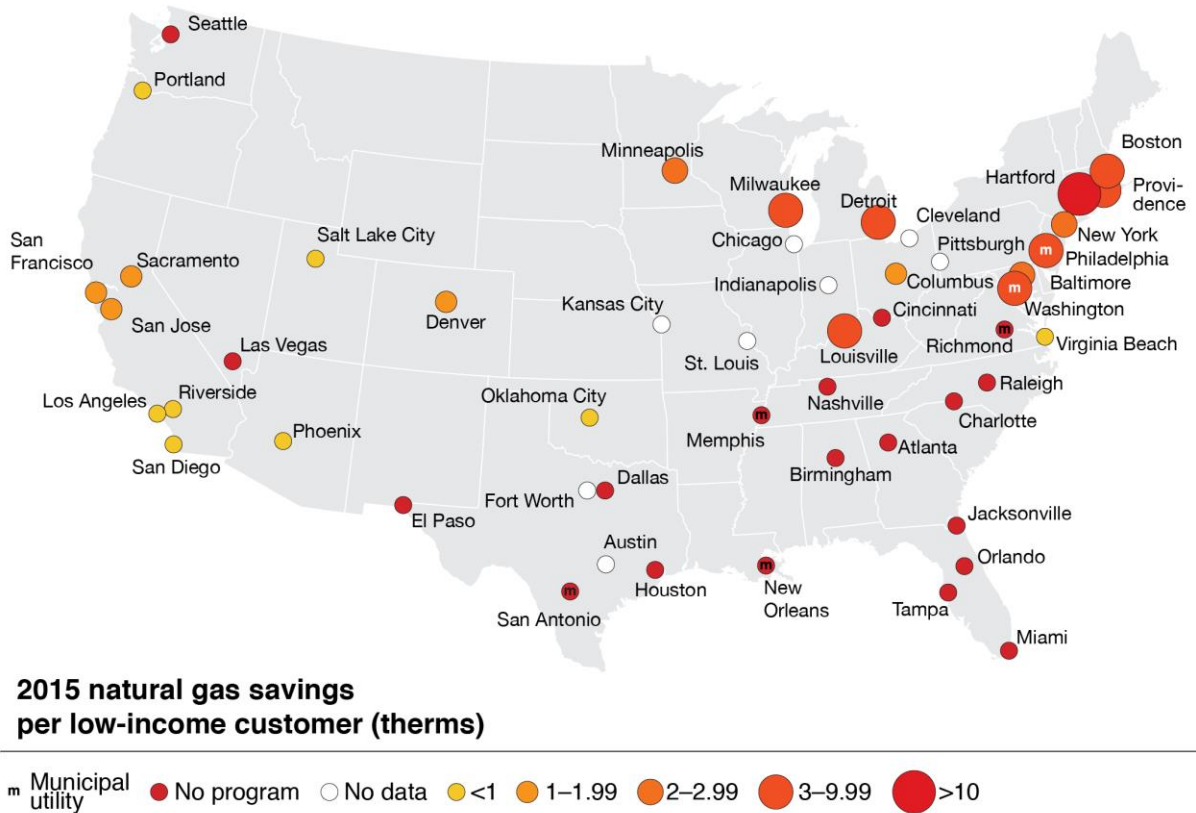


Figure 5. 2015 natural gas utility low-income savings by estimated number of low-income customers in each utility’s service territory

Table 8 shows the natural gas utilities with the five highest and lowest savings per estimated low-income customer in 2015.

Table 8. Five highest and lowest natural gas utility savings (therms) on low-income energy efficiency programs by estimated number of low-income customers in 2015

Natural gas utility	City	State	2015 savings per low-income customer (therms)*
Connecticut Natural Gas	Hartford	CT	12.59
National Grid	Boston	MA	7.25
Louisville Gas & Electric	Louisville	KY	6.39
We Energies	Milwaukee	WI	6.16
PGW	Philadelphia	PA	5.11
Questar Gas	Salt Lake City	UT	0.39
Oklahoma Natural Gas	Oklahoma City	OK	0.29
NW Natural	Portland	OR	0.28
Virginia Natural Gas (AGL Resources)	Virginia Beach	VA	0.05
Southwest Gas	Phoenix	AZ	0.01

* A therm is a unit of heat equivalent to 100,000 Btu.

SAVINGS PER PROGRAM PARTICIPANT

Table 9 shows the electric savings per program participant for electric utility low-income efficiency programs. Of the electric utilities in this study, 37 provided the savings and program participant information needed to calculate this value. The average savings per participant was 1,371 kWh.⁵

Table 9. Five highest and lowest electric low-income utility program savings (kWh) per program participant in 2015

Electric utility	City	State	2015 savings per program participant (kWh)
Entergy New Orleans	New Orleans	LA	6,066
Oncor	Dallas, Fort Worth	TX	4,935
CenterPoint Energy	Houston	TX	3,757
CPS Energy	San Antonio	TX	3,396
Oklahoma Gas and Electric	Oklahoma City	OK	3,279
Commonwealth Edison	Chicago	IL	392
PG&E	San Francisco	CA	318
Duquesne Light Co.	Pittsburgh	PA	203

⁵ Our analysis was unable to detect any discernable patterns that associate particular electric low-income program designs or measures with high energy savings per household. More research is needed to determine which measures and other program elements lead to high energy savings at the household level.

Electric utility	City	State	2015 savings per program participant (kWh)
San Diego Gas & Electric	San Diego	CA	186
Florida Power & Light	Miami	FL	52

Table 10 shows the natural gas savings per program participant for natural gas utility low-income efficiency programs. Only 17 natural gas utilities provided savings and program participant values for their 2015 low-income program. Of these utilities, the average program participant saved 145 therms.⁶

Table 10. Five highest and five lowest natural gas low-income utility program savings (therms) per program participant in 2015

Electric utility	City	State	2015 savings per program participant (therms)
Columbia Gas of Ohio	Columbus	OH	317
Louisville Gas & Electric	Louisville	KY	307
Oklahoma Natural Gas	Oklahoma City	OK	289
NW Natural	Portland	OR	216
We Energies	Milwaukee	WI	208
Xcel (Public Service Co. of CO)	Denver	CO	65
Southwest Gas	Phoenix	AZ	33
MichCon Gas (DTE Energy)	Detroit	MI	28
SoCal Gas	Los Angeles	CA	20
San Diego Gas & Electric	San Diego	CA	12

Low-Income Program Design

Although low-income programs vary in many ways, utilities can follow best practices when designing their low-income programs. Previous ACEEE research (Cluett, Amann, and Ou 2016) shed light on a variety of best practices for low-income program design, including

- Offering a range of eligible measures
- Coordinating with WAP and other organizations on program delivery
- Providing a portfolio of programs
- Addressing health and safety
- Developing dual fuel and fuel-blind programs
- Coordinating with bill payment assistance programs

⁶ As with electric low-income programs, we were also unable to detect a discernable pattern for program designs and measures from natural gas low-income programs that led to high energy savings. More research is needed to determine which measures and other program elements lead to the highest savings.

- Installing high-efficiency products and appliances

In this section, we present analysis of four areas of best practice: dual fuel, measures offered, targeting of households, and streamlining program enrollment. See tables A3 and A4 in Appendix A for more detailed analysis of measures and best practices by utility.

DUAL FUEL

Energy efficiency programs that address electric and natural gas end uses simultaneously enhance the potential to successfully deliver energy savings to households. For low-income programs, partnerships between electric and gas utilities are especially important. Compared to multiple independent programs operating separately, dual fuel or fuel-blind programs increase program cost-effectiveness through decreased labor costs associated with measure delivery and installation (Nowak, Kushler, and Witte 2014). Dual fuel programs can also act as a one-stop shop designed to minimize delivery costs of electric and gas measures while maximizing savings (Ehrendreich and Friedman 2016). This makes program enrollment easier for customers and allows them to access all programs for which they are eligible in order to receive the most benefit.

Figure 6 shows which cities have dual fuel programs, and whether the programs are jointly or independently administered by their electric and/or natural gas utilities.

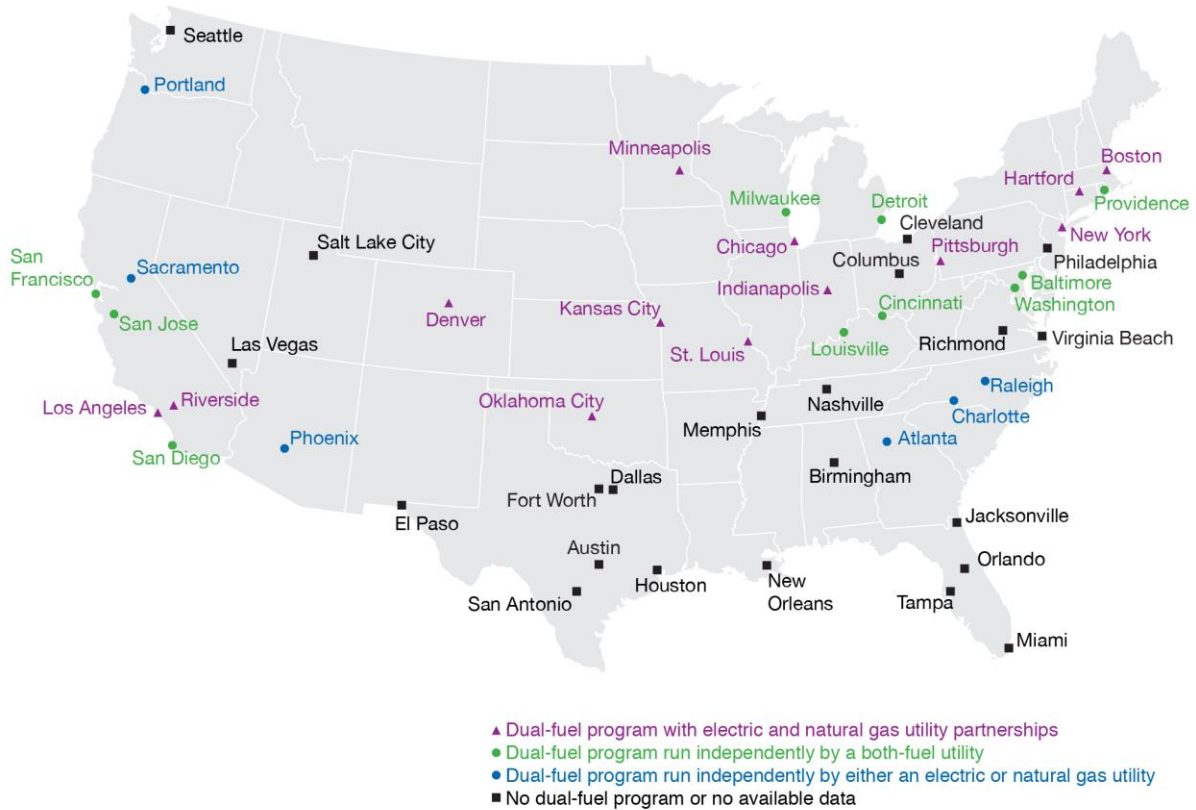


Figure 6. Cities with dual fuel ratepayer-funded low-income efficiency programs

Of the 51 cities in the study, 13 have electric and natural gas utilities that partner to administer low-income energy efficiency programs, 9 have dual fuel utilities that run a natural gas and electric low-income program independently, and 7 have single fuel utilities that independently run a dual fuel low-income program. The electric and natural gas utilities that partner on their programs can pool funds to address both electric and gas end uses and provide various joint measures to low-income households. For example, the Los Angeles Department of Water and Power (LADWP) partners with Southern California Gas in Los Angeles, Oklahoma Gas & Electric partners with Oklahoma Natural Gas in Oklahoma City, and AmerenUE partners with Laclede Gas in St. Louis to offer joint low-income programs addressing both end uses. In some cases, electric or natural gas utilities provide a low-income program that addresses both end uses independently, without partnering with another utility. Examples of this include Georgia Power in Atlanta and Seattle City Light.

MEASURES OFFERED

We analyzed measures included in each electric and natural gas low-income efficiency program and assigned measures to the following categories: lighting, air sealing, insulation, water efficiency, water heater upgrades, HVAC repair and replacement, appliance upgrades and repairs, smart thermostats, and health and safety.⁷ These measures are cited in previous ACEEE research on best practice low-income programs (Cluett, Amann, and Ou 2016). Figure 7 shows the distribution of these measures for electric utilities across 49 cities and 46 unique utilities.⁸

⁷ For both electric and natural gas programs, lighting measures included bulbs, CFLs, LEDs, nightlights, torchieres, lighting fixtures, exit lights, and flood lights. Air sealing measures included air sealing, air infiltration reduction, weatherstripping, foam, caulk, door sweeps, and duct work. Insulation measures included duct, wall, envelope, attic, ceiling, floor, basement, knee wall door, sill box, band joist, and mobile home insulation. Water efficiency measures included water saving kits, water leak fixes, shower valves, irrigation repairs, aerators, showerheads, toilet flappers, toilet replacement, and plumbing repairs. Water heater measures included upgrades, repairs, heat pumps, insulation, replacement, and blankets. HVAC measures included repair and replacement of furnaces, boilers, and AC systems. Appliance upgrades included replacing refrigerators, freezers, clothes washers, clothes dryers, dishwashers, dehumidifiers, and microwaves. Health and safety measures included specific fixes, carbon monoxide detectors, smoke detectors, and bathroom and dryer vents.

⁸ Data on measures include 47 electric utilities for which information on measures was available. We obtained information on measures from the data request and from program descriptions on the web and in demand-side management and evaluation reports. Some programs may include additional measures that these sources did not list.

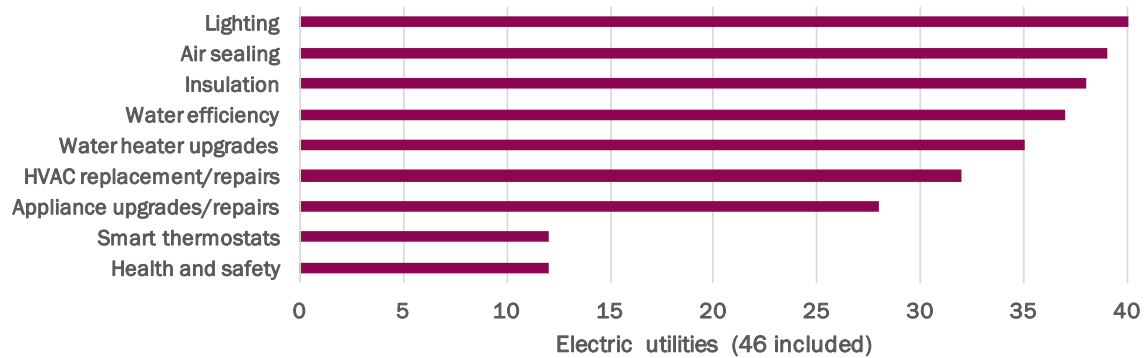


Figure 7. Measures included in electric utility low-income energy efficiency programs

Many of these measures may lead to high energy savings by addressing heating and cooling end uses such as HVAC upgrades, insulation, and air sealing (EPA 2011). Saving water has also been linked with saving energy, and water efficiency measures can lead to energy savings at both the residential and utility levels (Young 2014). Allowing for health and safety upgrades as part of low-income programs is also important, as housing deficiencies can often prevent low-income energy efficiency upgrades from being completed (Cluett, Amann, and Ou 2016). Health and safety measures can also reduce heat-related illness and deaths, lower the risk of home fires due to utility disconnections, and help prevent asthma and other respiratory diseases caused by mold and poor ventilation (Kuholski, Tohn, and Morley 2010). Although many utilities did not list health and safety measures as permitted in their ratepayer-funded efficiency programs, WAP and other weatherization programs often include health and safety upgrades. Therefore, when programs are administered jointly, health and safety measures may be applied even if ratepayer funds are not allocated toward those specific upgrades.

Of the 49 cities in this study offering an electric low-income program, we found that the majority of cities have access to programs with lighting, air sealing, and insulation measures. Water efficiency measures and water heating measures were less common, followed by HVAC repairs and replacements and appliance upgrades and repairs, though the majority of electric low-income programs offered these measures. Smart thermostats and health and safety measures were the least common program measures, offered by 12 programs at most.

As figure 8 shows, of the 31 cities with 29 unique utilities in the study offering a natural gas low-income efficiency program, the most common measures included were insulation, air sealing, HVAC replacement and repairs, and water heater upgrades. Less common, but still offered by the majority of programs, were water efficiency measures. Appliance upgrades, smart thermostats, health and safety upgrades, and lighting were offered by less than half of the natural gas low-income programs in this analysis.⁹

⁹ Data on measures include 31 natural gas utilities for which information on measures was available. Information on measures was obtained from our data request and from program descriptions on the web and in demand-

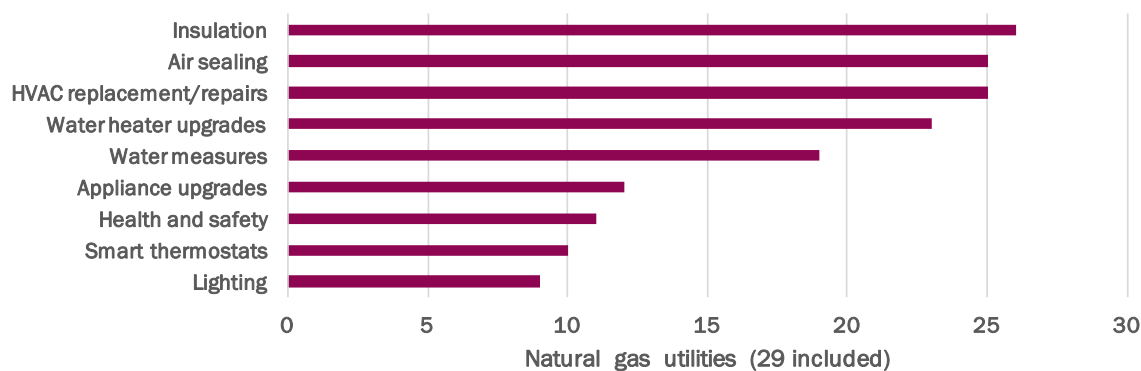


Figure 8. Measures included in natural gas utility low-income energy efficiency programs

In Appendix A, some measures are shown in table A4 for electric utilities and A5 for natural gas utilities, including appliance upgrades, health and safety, and water efficiency.

TARGETING HOUSEHOLDS

Some electric and natural gas low-income programs target specific subsets of the low-income demographic such as households with children, the elderly, people with disabilities, and high energy users.¹⁰ In some cases, low-income programs are available only to specific demographics (e.g., elderly households). In the majority of cases, however, all low-income households can participate in a program, even if they are not in the specifically targeted group.

Utilities that target their low-income program enrollment at specific groups that are susceptible to high energy burdens can create overall benefits beyond just energy savings. According to an international study that examined the benefits of low-income efficiency programs, energy efficiency measures can lead to long-term health and cost benefits for children in low-income households (Heffner and Campbell 2011). Further, people with disabilities are also an underserved group and often experience both higher energy burdens and limited opportunities to earn income (Yin, Shaewitz, and Megra 2014). Utilities can better reach these vulnerable populations by targeting their low-income programs to them.

Although many programs do not specifically target households, the majority of cities have at least one program that targets a specific group, with many targeting more than one group. High energy users and elderly residents are the most commonly targeted groups, and many programs are aimed at both (see figure 9). In Appendix A, tables A4 and A5 show the utilities that target specific households for their low-income programs.

side management and evaluation reports. Additional measures may be included in some programs that were not listed in these sources.

¹⁰ For example, WAP allows states to give preference to people over the age of 60, families with one or more members with a disability, or families with children (Benefits.gov 2017). Similarly, utility programs can target these and other specific groups for enrollment in low-income efficiency programs.

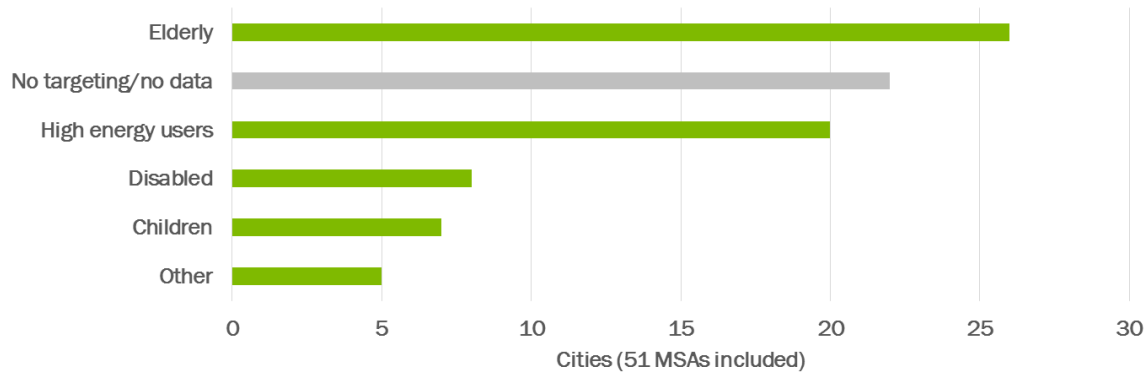


Figure 9. Number of cities (out of the 51 largest MSAs) that have an electric and/or natural gas utility low-income efficiency program that targets a specific subset of low-income households. *Other* includes veterans, members of Native American tribes, United Way beneficiaries, US Department of Housing and Urban Development (HUD)-subsidized households, LIHEAP customers, and landlords.

STREAMLINING PROGRAM ENROLLMENT

Programs that streamline eligibility can increase enrollment by allowing customers who are eligible for or enrolled in other income-qualified programs to easily enroll in energy efficiency programs. Across the country, many non-utility low-income assistance programs already use streamlined enrollment methods; streamlining has been found to reach more qualified individuals while reducing administrative costs (CBPP 2013). Lower administrative costs can allow utilities to increase the program share spent on program measures and incentives. To streamline enrollment, programs can use income eligibility criteria from WAP, LIHEAP, other federal programs, state or local programs, and other utility programs. Figure 11 shows how many programs streamline enrollment either by recognizing other income qualifications, such as those from other utility or federal programs, or by automatically enrolling customers who are enrolled in another program.¹¹ We were unable to identify streamlining data for three cities: Detroit, Providence, and Tampa.

¹¹ Other federal programs include Supplemental Nutrition Assistance Program (SNAP), Women, Infants, and Children (WIC), Supplemental Security Income (SSI), Tribal Energy Program, Temporary Assistance for Needy Families (TANF), Children's Health Insurance Program (CHIP), Veterans Affairs Supportive Housing (VASH), National School Lunch Program (NSL), Medicaid, Lifeline Assistance, and Public Housing Agency (PHA) programs. Local programs include the Medical Access Program (MAP) in Austin. Other utility programs include bill assistance programs and budget billing programs, as well as Percentage of Income Payment Plan (PIPP), Customer Assistance Program (CAP), Physician Certified Allowance Discount (PCAD), Pepco Residential Program, other utility programs, and the Office of Home Energy Programs.

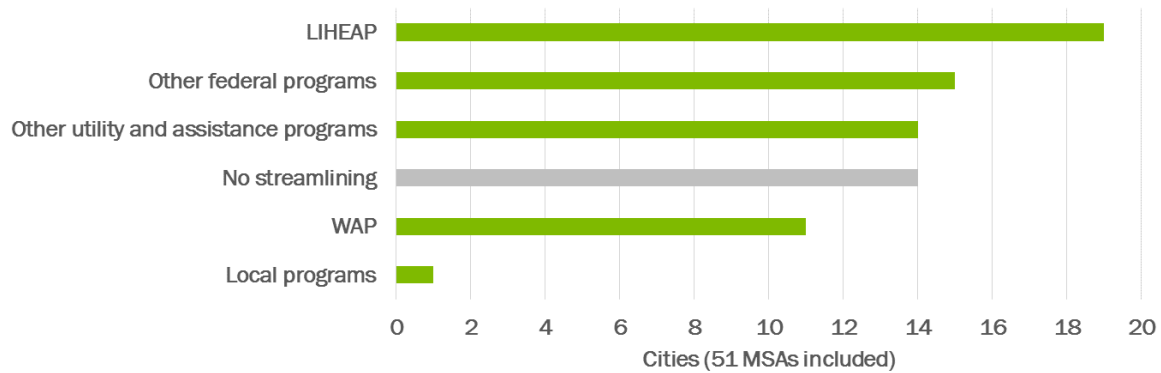


Figure 10. Number of cities (out of 51 of the largest MSAs) with an electric or natural gas low-income utility program that streamlines eligibility requirements

The majority of cities had either an electric or natural gas utility that used streamlining methods to more easily enroll customers. Using LIHEAP eligibility requirements was the most common method, followed by other federal programs, then other utility programs (such as bill assistance programs). In total, 14 cities did not have a utility that offered streamlining for its low-income programs. Tables A4 and A5 in Appendix A show which utilities streamline enrollment for their low-income programs.

PARTNERING WITH WAP

WAP provides weatherization services to households across the country. Some utilities partner with local WAP providers to streamline program enrollment and administrative resources. Where strong WAP providers exist, utility programs can leverage their resources. In some cases, utilities and WAP providers pool funds in order to provide the most comprehensive weatherization and efficiency upgrades for low-income households. This method lets utility funds cover measures that WAP funding would not cover. According to our study, half of the electric and half of the natural gas utilities claim to leverage their relationships with WAP in their low-income program delivery.

An example here is in Massachusetts, where the Low-Income Energy Affordability Network (LEAN) helps coordinate utility ratepayer-funded efficiency with WAP. For Massachusetts programs, all applicable revenue streams are leveraged to enhance services. Columbia Gas of Ohio's energy efficiency programs also coordinate with WAP to lower startup costs and maximize and extend the available services and funding.

Conclusions and Next Steps

This baseline assessment of utility low-income programs provides a broad understanding of the breadth and scope of these programs, as well as elements of their design and delivery. Although the majority of utilities serving large urban areas provide efficiency programs specifically targeted at low-income households, the programs vary widely in terms of spending, savings, design, and delivery. Some low-income programs focus on whole-building retrofits and include high spending to facilitate complete building envelope revamps. Other programs focus on direct-install and smaller-scale measures, which typically have different savings and spending values.

Approximately one-fourth of the cities we studied have two utilities partnering on a dual fuel low-income program, while another third have a single utility addressing both end uses in its low-income program. Many utilities also use LIHEAP and WAP qualifications, as well as other federal, utility assistance, and local programs to reduce administrative costs and streamline low-income program enrollment.

Many programs have room to provide additional best practice measures, such as water efficiency and appliance upgrades. Approximately 65% of the electric programs and 52% of the natural gas programs in this study included appliance upgrades as an offered program measure. Because low-income households are more likely to have older appliances, appliance upgrades have the potential for greater energy savings for these customers (Cluett, Amann, and Ou 2016). Additionally, few low-income programs include smart thermostats, which is a promising area to explore further in terms of their impact on energy savings in low-income households.

While many utility program managers were able to give us data on their low-income programs, there is opportunity for utilities to improve their ability to collect and report on low-income program spending, savings, customers served, and other program details. Demographic data on low-income program participation could be very useful in determining how effectively low-income programs reach targeted households or vulnerable communities. Although some utilities have begun collecting demographic data, few report it publicly or use it in their program evaluations.

Our study provides a foundational overview of low-income energy efficiency programs across the country, but more research is needed to determine which program elements lead to high energy savings or other successful outcomes. Future ACEEE research will delve into these questions. We also hope to repeat this research in a few years to track progress on how utility-supported programs are serving low-income households. Data from this analysis are available in the ACEEE State and Local Policy Database at database.aceee.org; for more information on our low-income research and resources, see aceee.org/topics/low-income-programs.

References

- Benefits.gov. 2017. "Weatherization Assistance Program for Low-Income Persons." Washington, DC: DOE (Department of Energy). Accessed May. www.benefits.gov/benefits/benefit-details/580.
- CBPP (Center on Budget and Policy Priorities). 2013. *Streamlining Health Coverage for SNAP Recipients*. Washington, DC: CBPP. www.cbpp.org/sites/default/files/atoms/files/snapmedicaidstreamline.pdf.
- Cluett, R., J. Amann, and S. Ou. 2016. *Building Better Energy Efficiency Programs for Low-Income Households*. Washington, DC: ACEEE. aceee.org/research-report/a1601.
- Drehobl, A., and L. Ross. 2016. *Lifting the High Energy Burden in America's Largest Cities: How Energy Efficiency Can Improve Low-Income and Underserved Communities*. Washington, DC: ACEEE. aceee.org/research-report/u1602.
- Ehrendreich, G., and J. Friedman. 2016. *Well-Suited Energy Efficiency: Tailoring Programs for Multifamily Buildings*. Chicago: Midwest Energy Efficiency Alliance. www.mwalliance.org/sites/default/files/media/MEEA_2017_Well-Suited-Multifamily-EE_Feb2017.pdf.
- EIA (Energy Information Administration). 2016a. "Electric Power Sales, Revenue, and Energy Efficiency Form EIA-861 Detailed Data Files." www.eia.gov/electricity/data/eia861/index.html.
- . 2016b. "Natural Gas Annual Respondent Query System (EIA-176 Data through 2015)." www.eia.gov/cfapps/ngqs/ngqs.cfm?f_report=RP1.
- EPA (Environmental Protection Agency). 2011. *Energy Efficiency in Affordable Housing*. Washington, DC: EPA. www.epa.gov/sites/production/files/2015-08/documents/affordable_housing.pdf.
- Heffner, G., and N. Campbell. 2011. *Evaluating the Co-Benefits of Low-Income Energy-Efficiency Programmes*. Paris: IEA (International Energy Agency). www.iea.org/publications/freepublications/publication/low_income_energy_efficiency.pdf.
- Kuholski, K., E. Tohn, and R. Morley. 2010. "Healthy Energy-Efficient Housing: Using a One-Touch Approach to Maximize Public Health, Energy, and Housing Programs and Policies." *Journal of Public Health Management and Practice* 16 (5): S68–74. www.greenandhealthyhomes.org/sites/default/files/3Healthy_Energy_Efficient_Housing.pdf.
- NEADA (National Energy Assistance Directors' Association). 2010. *2009 National Energy Assistance Survey*. Washington, DC: NEADA. neada.org/wp-content/uploads/2013/03/neada_2009_survey_report_4_16_10.pdf.

- Nowak, S., M. Kushler, and P. Witte. 2014. *Successful Practices in Combined Gas and Electric Utility Energy Efficiency Programs*. Washington, DC: ACEEE. aceee.org/research-report/u1406.
- US Census Bureau. 2017. "Poverty Status in the Past 12 Months: American Community Survey 1-Year Estimates, Table S1701 (2015 data)." factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_15_1YR_S1701&prodType=table.
- Yin, M., D. Shaewitz, and M. Megra. 2014. *An Uneven Playing Field: The Lack of Equal Pay for People with Disabilities*. Washington, DC: American Institutes for Research. www.air.org/sites/default/files/Lack%20of%20Equal%20Pay%20for%20People%20with%20Disabilities_Dec%202014.pdf.
- Young, R. 2014. *Watts in a Drop of Water: Savings at the Water-Energy Nexus*. Washington, DC: ACEEE. aceee.org/sites/default/files/watts-in-drops.pdf.

Appendix A. Data Tables

Table A1. Estimated number of low-income customers in each utility's service territory

City	State	2015 state poverty (200% FPL)	2015 MSA poverty (200% FPL)	Electric utility	Number of utility residential customers in 2015 (EIA 861)	Estimated low-income customers in 2015	Natural gas utility	Number of utility residential customers in 2015 (EIA 176)	Estimated low-income customers in 2015
Atlanta	GA	37%		Georgia Power	2,118,033	783,672	Atlanta Gas Light	1,457,330	539,212
Austin	TX	35%	28.5%	Austin Energy	403,754	115,070	Texas Gas Service	606,471	212,265
Baltimore	MD	23%		Baltimore Gas and Electric	1,132,934	260,575	Baltimore Gas and Electric	616,994	141,909
Birmingham	AL	37%		Alabama Power	1,253,875	463,934	Alagasco	391,823	144,975
Boston	MA	26%		Eversource	1,063,565	276,527	National Grid (Boston Gas Co.)	626,126	162,793
Charlotte	NC	35%		Duke Energy Carolinas	1,646,664	576,332	Piedmont Natural Gas	644,844	225,695
Chicago	IL	28%		Commonwealth Edison	3,520,329	985,692	Peoples Gas	784,108	219,550
Cincinnati	OH	32%		Duke Energy Ohio	623,795	199,614	Duke Energy Ohio	385,647	123,407
Cleveland	OH	32%		First Energy	661,143	211,566	Dominion East Ohio	1,099,922	351,975
Columbus	OH	32%		American Electric Power	1,276,363	408,436	Columbia Gas of Ohio	1,311,371	419,639
Dallas, Fort Worth	TX	35%		Oncor	2,913,780	1,019,823	Atmos Energy	1,747,270	611,545
Denver	CO	25%		Xcel (Public Service Co. of CO)	1,211,662	302,916	Xcel (Public Service Co. of CO)	1,247,084	311,771
Detroit	MI	29%		DTE Energy	1,953,779	566,596	MichCon Gas (DTE Energy)	1,144,825	331,999
El Paso	TX	35%		El Paso Electric	273,030	95,561	Texas Gas Service	606,471	212,265
Hartford	CT	23%		Eversource	1,117,897	257,116	Connecticut Natural Gas	155,912	35,860
Houston	TX	35%		CenterPoint Energy	2,079,899	727,965	CenterPoint Energy	1,554,459	544,061
Indianapolis	IN	32%		Indianapolis Power & Light	431,182	137,978	Citizens Energy Group	244,392	78,205
Jacksonville	FL	37%		JEA	391,219	144,751	TECO Peoples Gas	326,636	120,855
Kansas City	MO	31%		KCP&L	243,292	75,421	Missouri Gas	1,052,664	294,746
Las Vegas	NV	35%		NV Energy	781,871	273,655	Southwest Gas	678,955	237,634
Los Angeles	CA	33%	36.2%	LADWP	1,315,413	476,180	SoCal Gas	5,461,534	1,802,306
Louisville	KY		30.8%	Louisville Gas & Electric	353,419	108,853	Louisville Gas & Electric	294,527	90,714

City	State	2015 state poverty (200% FPL)	2015 MSA poverty (200% FPL)	Electric utility	Number of utility residential customers in 2015 (EIA 861)	Estimated low-income customers in 2015	Natural gas utility	Number of utility residential customers in 2015 (EIA 176)	Estimated low-income customers in 2015
Memphis	TN		38.9%	MLGW	366,720	142,654	MLGW	291,449	113,374
Miami	FL	37%		Florida Power & Light	4,169,028	1,542,540	Florida City Gas	99,527	36,825
Milwaukee	WI	29%		We Energies	993,147	288,013	We Energies	436,776	126,665
Minneapolis	MN	22%		Xcel (Northern State Power)	1,122,172	246,878	CenterPoint Energy	764,672	168,228
Nashville	TN		30.8%	Nashville Electric Service	336,053	103,504	Piedmont Natural Gas	159,162	55,707
New Orleans	LA		36.8%	Entergy New Orleans	161,498	59,431	Energy New Orleans	99,910	36,967
New York	NY	31%		ConEdison	2,886,034	894,671	National Grid (Brooklyn Union Gas)	1,219,393	378,012
Oklahoma City	OK	39%		Oklahoma Gas & Electric	646,260	252,041	Oklahoma Natural Gas Co.	792,550	309,095
Orlando	FL		37.8%	Orlando Utilities Commission	195,605	73,939	TECO Peoples Gas	326,636	120,855
Philadelphia	PA	28%		PECO	1,439,684	403,112	PGW	473,175	127,284
Phoenix	AZ	38%		Arizona Public Service	1,046,989	397,856	Southwest Gas	989,044	375,837
Pittsburgh	PA	28%		Duquesne Light Co.	524,560	146,877	Peoples Natural Gas	582,017	162,965
Portland	OR	31%		Portland General Electric Co.	742,466	230,164	NW Natural	571,534	177,176
Providence	RI	29%		National Grid RI	434,749	126,077	National Grid RI	236,323	68,534
Raleigh	NC	35%		Duke Energy Progress	1,107,292	387,552	PSNC Energy	481,254	168,439
Richmond	VA	28%		Dominion Virginia Power	2,150,818	602,229	Richmond Dept. of Public Utilities	101,335	27,664
Riverside	CA		39.6%	City of Riverside Public Service	96,664	38,279	SoCal Gas	5,461,534	1,802,306
Sacramento	CA		31.7%	SMUD	546,155	173,131	PG&E	4,217,828	1,391,883
Salt Lake City	UT	28%		Rocky Mountain Power	764,088	213,945	Questar Gas	882,018	246,965
San Antonio	TX		35.4%	CPS Energy	693,288	245,424	CPS Energy	316,787	112,143
San Diego	CA	33%		San Diego Gas & Electric	1,266,249	417,862	San Diego Gas & Electric	939,988	310,196
San Francisco, San Jose	CA	33%		PG&E	4,749,486	1,567,330	PG&E	4,217,828	1,391,883
Seattle	WA	28%	23.8%	Seattle City Light	381,419	90,778	Puget Sound Energy	737,339	206,455
St. Louis	MO	28%		AmerenUE	1,043,603	292,209	Laclede Gas	1,052,664	294,746

City	State	2015 state poverty (200% FPL)	2015 MSA poverty (200% FPL)	Electric utility	Number of utility residential customers in 2015 (EIA 861)	Estimated low-income customers in 2015	Natural gas utility	Number of utility residential customers in 2015 (EIA 176)	Estimated low-income customers in 2015
Tampa	FL	37%		Tampa Electric Co.	635,403	235,099	TECO Peoples Gas	326,636	120,855
Virginia Beach	VA	28%		Dominion Virginia Power	2,150,818	602,229	Virginia Natural Gas (AGL)	265,611	74,371
Washington	DC	31%		Pepco	639,804	198,339	Washington Gas	147,895	45,847

State and MSA poverty data from US Census Bureau 2017. Number of electric utility customers from EIA 2016a. Number of natural gas utility customers from EIA 2016b. Estimated low-income customers calculated using state or MSA poverty rate (municipal utilities use MSA poverty data, investor owned utilities use state poverty data) multiplied by the number of utility customers.

Table A2. Electric low-income program spending and savings in the 51 largest MSA in 2015

Electric utility	City	State	2015 low-income program spending	2015 low-income program savings (MWh)	2015 low-income customers served	\$/total low-income customers	kWh/ total low-income customers	\$/program participant	kWh saved/program participant
<i>Alabama Power</i>	<i>Birmingham</i>	<i>AL</i>							
AmerenUE (Union Electric)	St. Louis	MO	\$3,400,000	4,700	5,200	\$11.64	16.08	\$653.85	903.85
American Electric Power (Ohio Power)	Columbus	OH	\$6,651,548	7,440	5,884	\$16.29	18.22	\$1,130.45	1,264.45
Arizona Public Service	Phoenix	AZ	\$2,274,342	1,793	738	\$5.72	4.51	\$3,081.76	2,429.54
Austin Energy	Austin	TX	\$2,125,667	568	520	\$18.47	4.94	\$4,087.82	1,092.31
Baltimore Gas & Electric	Baltimore	MD	\$13,760,000	2,521	2,273	\$52.81	9.67	\$6,053.67	1,109.11
CenterPoint Energy	Houston	TX	\$3,777,530	3,843	1,023	\$5.19	5.28	\$3,692.60	3,756.60
City of Riverside Public Service	Riverside	CA	\$57,000	93	160	\$1.49	2.44	\$356.25	584.01
ComEd	Chicago	IL	\$7,301,813	8,617	21,997	\$7.41	8.74	\$331.95	391.74
ConEdison	New York City	NY	\$4,933,450	7,883	17,918	\$5.51	8.81	\$274.37	438.40
CPS Energy (City of San Antonio)	San Antonio	TX	\$21,803,784	13,759	4,051	\$88.84	56.06	\$5,382.32	3,396.33
Dominion Virginia Power (Virginia Electric P&L)	Richmond, Virginia Beach	VA	No data	777	No data	No data	1.29	No data	No data
DTE Energy	Detroit	MI	\$7,400,000	24,840	39,675	\$13.06	43.84	\$186.52	626.09
Duke Energy Carolinas	Charlotte	NC	\$2,000,000	2,669	6,287	\$3.47	4.63	\$318.12	424.53

Electric utility	City	State	2015 low-income program spending	2015 low-income program savings (MWh)	2015 low-income customers served	\$/total low-income customers	kWh/ total low-income customers	\$/program participant	kWh saved/program participant
Duke Energy Ohio	Cincinnati	OH	\$708,000	1,974	2,000	\$3.55	9.89	\$354.00	987.00
Duke Energy Progress	Raleigh	NC	\$1,500,000	2,896	4,500	\$3.87	7.47	\$333.33	643.56
Duquesne Light Co	Pittsburgh	PA	\$1,665,000	5,453	26,972	\$11.34	37.13	\$61.83	202.51
El Paso Electric	El Paso	TX	\$651,474	1,480	1,157	\$6.82	15.49	\$563.07	1,279.17
Entergy New Orleans	New Orleans	LA	\$743,327	1,335	220	\$12.51	22.46	\$3,378.76	6,066.12
Eversource	Boston	MA	\$25,387,428	23,490	14,120	\$91.81	84.95	\$1,797.98	1,663.60
Eversource	Hartford	CT	\$17,795,096	14,098	12,023	\$69.21	54.83	\$1,480.09	1,172.59
Exelon - PECO	Philadelphia	PA	\$13,033,000	14,508	16,848	\$32.33	35.99	\$773.56	861.11
First Energy (Cleveland Electric Illuminating) *	Cleveland	OH	\$6,562,783	9,155	5,142	\$31.02	43.27	\$1,276.31	1,780.44
Florida Power & Light Co.	Miami	FL	\$89,000	104	2,000	\$0.06	0.07	\$44.50	51.96
Georgia Power	Atlanta	GA	\$2,000,000	No data	1,300	\$2.55	No data	\$1,538.46	No data
Indianapolis Power & Light	Indianapolis	IN	\$482,626	1,149	1,501	\$3.50	8.33	\$321.54	765.49
JEA	Jacksonville	FL	\$650,000	862	1,150	\$4.49	5.96	\$565.22	749.82
KCP&L	Kansas City	MO	\$1,664,079	No data	No data	\$22.06	No data	No data	No data
LADWP	Los Angeles	CA	\$7,494,076	6,655	No data	\$15.74	13.98	No data	No data
Louisville Gas & Electric	Louisville	KY	\$1,618,707	3,884	1,890	\$14.87	35.68	\$856.46	2,055.03
Memphis Light, Gas & Water	Memphis	TN	\$337,500	No data	No data	\$2.37	No data	No data	No data
<i>Nashville Electric Service</i>	<i>Nashville</i>	<i>TN</i>							
National Grid RI(Narragansett Electric)	Providence	RI	\$10,105,000	6,587	10,500	\$80.15	52.25	\$962.38	627.33
NV Energy (Nevada Power Co.)	Las Vegas	NV	No data	No data	No data	No data	No data	No data	No data
Oklahoma Gas & Electric	Oklahoma City	OK	\$5,936,312	11,900	3,629	\$23.55	47.21	\$1,635.80	3,279.14
ONCOR	Dallas, Fort Worth	TX	\$12,981,305	23,044	4,669	\$12.73	22.60	\$2,780.32	4,935.44
Orlando Utilities Commission	Orlando	FL	\$103,801	72	149	\$1.40	0.97	\$696.65	483.25
PEPCO	Washington	DC	\$4,849,467	4,716	No data	\$24.45	23.78	No data	No data

Electric utility	City	State	2015 low-income program spending	2015 low-income program savings (MWh)	2015 low-income customers served	\$/total low-income customers	kWh/ total low-income customers	\$/program participant	kWh saved/program participant
PG&E	San Francisco, San Jose	CA	\$112,155,783	31,960	100,573	\$71.56	20.39	\$1,115.17	317.78
Portland General Electric Co.	Portland	OR	\$6,801,565	3,874	1,732	\$29.55	16.83	\$3,927.00	2,236.92
Rocky Mountain Power (PacifiCorp)	Salt Lake City	UT	\$63,903	246	306	\$0.30	1.15	\$208.83	803.92
San Diego Gas & Electric	San Diego	CA	\$8,879,917	3,760	20,209	\$21.25	9.00	\$439.40	186.06
Seattle City Light	Seattle	WA	\$3,539,243	5,907	No data	\$38.99	65.07	No data	No data
SMUD	Sacramento	CA	No data	No data	No data	No data	No data	No data	No data
Tampa Electric Co	Tampa	FL	\$3,994,280	4,666	7,912	\$16.99	19.85	\$504.84	589.77
We Energies	Milwaukee	WI	\$18,264,184	3,726	3,081	\$63.41	12.94	\$5,928.01	1,209.35
Xcel (Northern States Power)	Minneapolis	MN	\$2,375,360	2,597	5,359	\$9.62	10.52	\$443.25	484.61
Xcel (Public Service Co. of CO)	Denver	CO	\$3,087,697	6,503	7,500	\$10.19	21.47	\$411.69	867.13

A gray row indicates the utility does not have an electric low-income program. * First Energy in Cleveland reported consolidated spending, savings, and customers served 2013–2015. The data in this row are from this three-year period.

Table A3. Natural gas utility low-income program spending and savings in the 51 largest MSA in 2015

Natural gas utility	City	State	2015 low-income program spending	2015 low-income program savings (MMtherms)	2015 low-income customers served	\$/total low-income customers	Therms saved/total low-income customers	\$/program participant	Therms saved/program participant
<i>Alagasco</i>	<i>Birmingham</i>	<i>AL</i>							
<i>Atlanta Gas Light</i>	<i>Atlanta</i>	<i>GA</i>							
ATMOS Energy	Fort Worth	TX	\$423,504	No data	323	\$0.69	No data	\$1,311.16	No data
Baltimore Gas & Electric	Baltimore	MD	\$2,054,072	0.30	2,273	\$14.47	2.10	\$903.68	131.03
CenterPoint Energy	Minneapolis	MN	\$2,665,523	0.37	1,799	\$15.84	2.20	\$1,481.67	205.32
<i>CenterPoint Energy</i>	<i>Houston</i>	<i>TX</i>							
Citizens Energy Group	Indianapolis	IN	\$432,000	No data	87	\$5.52	No data	\$4,965.52	No data

Natural gas utility	City	State	2015 low-income program spending	2015 low-income program savings (MMtherms)	2015 low-income customers served	\$/total low-income customers	Therms saved/total low-income customers	\$/program participant	Therms saved/program participant
Columbia Gas of Ohio (Nisource)	Columbus	OH	\$10,684,168	0.66	2,085	\$25.46	1.57	\$5,124.30	316.55
Connecticut Natural Gas	Hartford	CT	\$4,533,997	0.45	4,036	\$126.44	12.59	\$1,123.39	111.85
<i>CPS Energy (San Antonio PSB)</i>	<i>San Antonio</i>	<i>TX</i>							
Dominion East Ohio	Cleveland	OH	No data	No data	1,400	No data	No data	No data	No data
<i>Duke Energy Ohio</i>	<i>Cincinnati</i>	<i>OH</i>							
<i>Entergy New Orleans</i>	<i>New Orleans</i>	<i>LA</i>							
<i>Florida City Gas</i>	<i>Miami</i>	<i>FL</i>							
Laclede Gas	St. Louis	MO	\$1,420,424	No data	2,437	\$4.82	No data	\$582.86	No data
Louisville Gas & Electric	Louisville	KY	\$1,207,173	0.58	1,890	\$13.31	0.89	\$638.72	306.88
<i>Memphis Light, Gas & Water</i>	<i>Memphis</i>	<i>TN</i>							
MichCon Gas (DTE Energy)	Detroit	MI	\$5,280,000	1.10	39,675	\$15.90	3.31	\$133.08	27.73
Missouri Gas	Kansas City	MO	\$770,000	No data	No data	\$2.36	No data	No data	No data
Narragansett (National Grid RI)	Providence	RI	\$5,022,000	0.32	3,300	\$73.28	4.67	\$1,521.82	96.97
National Grid	Boston	MA	\$22,629,186	1.18	7,287	\$139.01	7.25	\$3,105.42	161.93
National Grid (Brooklyn Union Gas Co.)/ NYSERDA	New York City	NY	\$7,642,304	1.07	6,506	\$20.22	2.83	\$1,174.65	164.46
NW Natural	Portland	OR	\$1,246,030	0.05	231	\$7.03	0.28	\$5,394.07	216.45
Oklahoma Natural Gas Co.	Oklahoma City	OK	\$252,900	0.09	311	\$0.82	0.29	\$813.18	289.39
Peoples Gas	Chicago	IL	No data	No data	No data	No data	No data	No data	No data
Peoples Natural Gas	Pittsburgh	PA	\$2,141,694	No data	406	\$13.14	No data	\$5,275.11	No data
PG&E	Sacramento, San Francisco, San Jose	CA	\$24,619,562	2.21	No data	\$17.69	1.59	No data	No data
PGW	Philadelphia	PA	\$7,913,908	0.65	3,722	\$62.18	5.11	\$2,126.25	174.64
<i>Piedmont Natural Gas</i>	<i>Charlotte</i>	<i>NC</i>							

Natural gas utility	City	State	2015 low-income program spending	2015 low-income program savings (MMtherms)	2015 low-income customers served	\$/total low-income customers	Therms saved/total low-income customers	\$/program participant	Therms saved/program participant
<i>Piedmont Natural Gas</i>	<i>Nashville</i>	<i>TN</i>							
<i>PSNC Energy</i>	<i>Raleigh</i>	<i>NC</i>							
<i>Puget Sound Energy</i>	<i>Seattle</i>	<i>WA</i>							
Questar Gas	Salt Lake City	UT	\$673,123	0.10	933	\$2.73	0.39	\$721.46	103.49
<i>Richmond Department of Public Utilities</i>	<i>Richmond</i>	<i>VA</i>							
San Diego Gas & Electric	San Diego	CA	\$8,475,680	0.25*	20,209	\$27.32	0.81	\$419.40	12.37
SoCal Gas	Los Angeles, Riverside	CA	\$74,800,000	1.60	80,316	\$41.50	0.89	\$931.32	19.92
Southwest Gas	Phoenix	AZ	\$408,921	0.01	154	\$1.09	0.01	\$2,655.33	33.44
<i>Southwest Gas</i>	<i>Las Vegas</i>	<i>NV</i>							
<i>TECO Peoples Gas</i>	<i>Jacksonville, Orlando, Tampa</i>	<i>FL</i>							
Texas Gas Service	Austin	TX	\$278,805	No data	134	\$1.31	No data	\$2,080.63	No data
<i>Texas Gas Service</i>	<i>El Paso</i>	<i>TX</i>							
Virginia Natural Gas (AGL Resources)	Virginia Beach	VA	\$37,875	0.004	No data	\$0.51	0.05	No data	No data
Washington Gas (DC SEU)	Washington	DC	\$923,708	0.23	No data	\$20.15	5.02	No data	No data
We Energies (Wisconsin Energy)	Milwaukee	WI	\$8,443,151	0.78	3,748	\$66.66	6.16	\$2,252.71	208.11
Xcel (Public Service Co. of CO)	Denver	CO	\$3,174,843	0.60	9,248	\$10.18	1.92	\$343.30	64.88

A grey row indicates the utility does not have a natural gas low-income program. * San Diego Gas & Electric reported low-income natural gas savings separately from total residential and commercial savings. In order to calculate total savings with low-income savings, we added these values.

Table A4. Low-income electric utility program aspects by utility and city in 2015–2016

Electric utility	City	State	Building type, SF (single family) MF (multifamily) MH (mobile home)	Portfolio of low- income programs	Dual fuel programs	Appliance upgrades	Health and safety	Water efficiency	WAP and utility partnership	Targeted program	Streamline eligibility
Alabama Power	Birmingham	AL									
AmerenUE (Union Electric)	St. Louis	MO	MF		X	X		X			
American Electric Power (Ohio Power)	Columbus	OH	SF, MF, MH			X	X	X	X	X	
Arizona Public Service	Phoenix	AZ	SF, MF, MH			X	X		X		X
Austin Energy	Austin	TX	SF, MF	X			X	X		X	X
Baltimore Gas & Electric	Baltimore	MD	SF, MF, MH	X	X	X	X	X	X		X
CenterPoint Energy	Houston	TX	SF, MF			X		X			
City of Riverside Public Service	Riverside	CA	SF, MF, MH		X	X		X			X
ComEd	Chicago	IL	SF, MF, MH	X	X	X		X	X		X
ConEdison/NYSERDA	New York City	NY	SF, MF, MH	X	X	X	X	X	X	X	X
CPS Energy (City of San Antonio)	San Antonio	TX	SF				X				
Dominion Virginia Power (Virginia Electric P&L)	Richmond, Virginia Beach	VA						X		X	
DTE Energy	Detroit	MI	SF, MF		X	X	X	X			X
Duke Energy Carolinas	Charlotte	NC	SF, MF, MH	X	X	X		X	X		
Duke Energy Ohio	Cincinnati	OH	SF, MF, MH	X	X			X		X	
Duke Energy Progress	Raleigh	NC	SF, MF, MH		X			X			
Duquesne Light Co	Pittsburgh	PA	SF, MF, MH	X	X	X		X		X	
El Paso Electric	El Paso	TX	SF, MF, MH				X	X			X
Entergy New Orleans	New Orleans	LA	SF, MF, MH			X	X				
Eversource	Boston	MA	SF, MF	X	X	X	X	X	X	X	X
Eversource	Hartford	CT	SF, MF, MH	X	X	X	X	X	X		X
Exelon - PECO	Philadelphia	PA	SF, MF, MH			X	X	X		X	X
First Energy (Cleveland Electric Illuminating)	Cleveland	OH		X		X	X				

Electric utility	City	State	Building type, SF (single family) MF (multifamily) MH (mobile home)	Portfolio of low-income programs	Dual fuel programs	Appliance upgrades	Health and safety	Water efficiency	WAP and utility partnership	Targeted program	Streamline eligibility
Florida Power & Light Co.	Miami	FL						X	X		X
Georgia Power	Atlanta	GA	SF, MF, MH		X	X	X		X	X	
Indianapolis Power & Light	Indianapolis	IN	SF, MH		X		X	X			X
JEA	Jacksonville	FL	SF					X	X	X	X
KCP&L	Kansas City	MO	SF, MF, MH	X	X	X	X	X	X	X	X
LADWP	Los Angeles	CA	SF, MF, MH	X	X	X		X		X	X
Louisville Gas & Electric	Louisville	KY	SF, MF, MH		X	X	X	X		X	X
Memphis Light, Gas & Water	Memphis	TN	SF				X			X	
Nashville Electric Service	Nashville	TN									
National Grid RI(Narragansett Electric)	Providence	RI	SF, MF, MH		X	X			X		X
NV Energy (Nevada Power Co.)	Las Vegas	NV	SF, MF, MH			X	X	X	X		
Oklahoma Gas & Electric	Oklahoma City	OK	SF, MF, MH		X						
ONCOR	Dallas, Fort Worth	TX	SF, MF, MH	X		X		X	X		X
Orlando Utilities Commission	Orlando	FL	SF					X		X	
PEPCO	Washington	DC	SF, MF	X	X	X	X	X	X		X
PG&E	San Francisco, San Jose	CA	SF, MF, MH		X	X	X	X	X		X
Portland General Electric Co.	Portland	OR	SF, MF, MH	X	X	X	X	X	X	X	X
Rocky Mountain Power (PacifiCorp)	Salt Lake City	UT	SF, MF, MH			X	X	X	X	X	X
San Diego Gas & Electric	San Diego	CA	SF, MF, MH		X	X	X	X	X	X	X
Seattle City Light	Seattle	WA	SF, MF, MH	X		X	X	X			X
SMUD	Sacramento	CA									
Tampa Electric Co	Tampa	FL	SF, MF, MH					X	X	X	
We Energies	Milwaukee	WI	SF, MF, MH	X	X	X	X	X	X	X	X
Xcel (Northern States Power)	Minneapolis	MN	SF, MF	X	X	X		X	X		

Electric utility	City	State	Building type, SF (single family) MF (multifamily) MH (mobile home)	Portfolio of low-income programs	Dual fuel programs	Appliance upgrades	Health and safety	Water efficiency	WAP and utility partnership	Targeted program	Streamline eligibility
Xcel (Public Service Co. of CO)	Denver	CO	SF, MF, MH	X	X	X		X	X	X	X

A gray row indicates the utility does not have a natural gas low-income program. A blank cell indicates that a program element was absent or that we could not verify the information.

Table A5. Low-income natural gas utility program aspects by utility and city in 2015–2016

Natural gas utility	City	State	Building type, SF (single family) MF (multifamily) MH (mobile home)	Portfolio of low-income programs	Dual-fuel programs	Appliance upgrades	Health and safety	Water efficiency	WAP and utility program coordination	Targeted program	Streamline eligibility
<i>Alagasco</i>	<i>Birmingham</i>	<i>AL</i>									
<i>Atlanta Gas Light</i>	<i>Atlanta</i>	<i>GA</i>									
ATMOS Energy	Fort Worth	TX	SF, MF, MH					X		X	
Baltimore Gas & Electric	Baltimore	MD	SF, MF, MH	X	X	X	X	X	X		X
<i>CenterPoint Energy</i>	<i>Houston</i>	<i>TX</i>									
CenterPoint Energy	Minneapolis	MN	SF, MF, MH	X		X	X	X	X	X	
Citizens Energy Group	Indianapolis	IN	SF, MF			X		X		X	X
Columbia Gas of Ohio (Nisource)	Columbus	OH	SF, MF, MH				X		X	X	X
Connecticut Natural Gas	Hartford	CT	SF, MF, MH		X	X	X	X	X	X	X
<i>CPS Energy (San Antonio PSB)</i>	<i>San Antonio</i>	<i>TX</i>									
Dominion East Ohio	Cleveland	OH	SF, MF, MH				X			X	X
<i>Duke Energy Ohio</i>	<i>Cincinnati</i>	<i>OH</i>									
<i>Entergy New Orleans</i>	<i>New Orleans</i>	<i>LA</i>									
<i>Florida City Gas</i>	<i>Miami</i>	<i>FL</i>									
Laclede Gas	St. Louis	MO	SF, MF, MH	X	X		X	X		X	
Louisville Gas & Electric	Louisville	KY	SF, MF, MH		X	X	X	X		X	X
<i>Memphis Light, Gas & Water</i>	<i>Memphis</i>	<i>TN</i>									
MichCon Gas (DTE Energy)	Detroit	MI			X	X		X			
Missouri Gas	Kansas City	MO	SF, MF, MH	X	X		X	X		X	

Natural gas utility	City	State	Building type, SF (single family) MF (multifamily) MH (mobile home)	Portfolio of low-income programs	Dual-fuel programs	Appliance upgrades	Health and safety	Water efficiency	WAP and utility program coordination	Targeted program	Streamline eligibility
Narragansett (National Grid RI)	Providence	RI				X					
National Grid	Boston	MA	MF		X	X		X	X	X	
National Grid (Brooklyn Union Gas Co.)/NYSERDA	New York City	NY	SF, MF, MH	X	X	X	X	X	X	X	X
NW Natural	Portland	OR	SF, MF, MH				X			X	X
Oklahoma Natural Gas Co.	Oklahoma City	OK	SF, MF		X					X	X
Peoples Gas	Chicago	IL	SF, MF		X		X	X			
Peoples Natural Gas	Pittsburgh	PA	SF			X	X			X	X
PG&E	Sacramento, San Francisco, San Jose	CA	SF, MF, MH		X	X	X	X			X
PGW	Philadelphia	PA	SF			X	X	X		X	X
<i>Piedmont Natural Gas</i>	<i>Charlotte</i>	<i>NC</i>									
<i>Piedmont Natural Gas</i>	<i>Nashville</i>	<i>TN</i>									
<i>PSNC Energy</i>	<i>Raleigh</i>	<i>NC</i>									
<i>Puget Sound Energy</i>	<i>Seattle</i>	<i>WA</i>									
Questar Gas	Salt Lake City	UT					X		X		
<i>Richmond Department of Public Utilities</i>	<i>Richmond</i>	<i>VA</i>									
San Diego Gas & Electric	San Diego	CA	SF, MF, MH		X	X	X	X	X	X	X
SoCal Gas	Los Angeles, Riverside	CA	SF, MF, MH				X	X	X	X	X
<i>Southwest Gas</i>	<i>Las Vegas</i>	<i>NV</i>									
Southwest Gas	Phoenix	AZ	SF, MF, MH		X	X	X	X	X	X	X
<i>TECO Peoples Gas</i>	<i>Jacksonville, Orlando, Tampa</i>	<i>FL</i>									
Texas Gas Service	Austin	TX	SF			X			X	X	

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Virginia Natural Gas (AGL Resources)	Virginia Beach	VA						X	X		
Washington Gas (DC SEU)	Washington	DC	SF, MF	X	X	X	X	X	X		X
We Energies (Wisconsin Energy)	Milwaukee	WI	SF, MF, MH	X	X	X	X	X	X	X	X
Xcel (Public Service Co. of CO)	Denver	CO	SF, MF, MH	X	X	X		X	X	X	X

A gray row indicates the utility does not have a natural gas low-income program. A blank cell indicates that a program element was absent or that we could not verify the information.