

**Justice Center *et al.* Late-Filed Exhibit No. 3**  
**Examples of Affordability Programs with Automatic Enrollment**  
Docket Nos. E-7, Sub 1214 & E-2, Sub 1219

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**Request:** At the August 31, 2020 consolidated hearing, Commissioner McKissick asked Mr. Howat for examples of jurisdictions where persons receiving public assistance are automatically enrolled in rate affordability programs.<sup>1</sup>

**Response:** I am attaching a recent report by the American Council for an Energy-Efficiency Economy (*How High Are Household Energy Burdens?*). The report notes the importance of establishing cross-sector referral networks for program participants. These networks help lower barriers so that participants can more easily meet their energy, health, and housing needs. I am also including a report by Synapse Energy Economics that provides an overview of low-income assistance strategies, including the value of automatic enrollment. Below are examples of low-income programs around the country where participants are automatically enrolled:

**Example #1: New Jersey**

In New Jersey, the Universal Service Fund (“USF”) provides a monthly credit on gas and electric bills for eligible customers. The credit aims to ensure that customers are required to pay no more than 6% of their household income for utility service. Some applicants for food stamps, Pharmaceutical Assistance to the Aged and Disabled (“PAAD”), Lifeline Energy Assistance, and Medicare Part D are automatically screened for Universal Service Fund (“USF”) benefits and/or enrolled in the Low-Income Home Energy Assistance Program (“LIHEAP”) and do not have to fill out a separate application. In general, this is done for applicants who are eligible for one of the above programs, who pay for heat, and who live in a household that includes only members who are considered in determining eligibility for both programs.

**Example #2: Massachusetts**

Massachusetts has several affordability programs that use certain public assistance programs to determine eligibility. Attached is a 2019 report from Columbia Gas of Massachusetts documenting the number of customers enrolled in the low-income discount rate through electronic file transfers.

**Example #3: New York**

Consolidated Edison of New York uses an efficient automatic enrollment system, as summarized in a report<sup>2</sup> by Synapse Energy Economics:

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<sup>1</sup> *Transcript of Consolidated Hearing Held via Videoconference on August 31, 2020 – Volume 10*, Docket Nos. E-7, Sub 1214, E-2, Sub 1219, E-7, Sub 1213 at pp. 146-49 (Sept. 9, 2020).

<sup>2</sup> Nancy Brockway, Jenn Kallay, & Erin Malone, *Low-Income Assistance Strategy Review Options for the design and implementation of ratepayer-funded assistance programs for low-income electricity customers*, Synapse Energy Economics at pp. 22-23 (Nov. 11, 2014) (<https://www.synapse-energy.com/sites/default/files/Low-Income-Assistance-Strategy-Review-14-111.pdf>).

Twice a year, Consolidated Edison shares the names and addresses of its non-participating residential customers with the New York City Department of Human Services, which administers most means-tested programs offered in the city. The Department of Human Services matches the names with its lists of participants of the allowed categorical eligibility programs and identifies those customers who appear on both lists. At this point, the Department of Human Services sends a letter to the customers advising them of their eligibility to participate in the utility's long-run affordability program. In New York, the letter provides an opportunity to opt out; if the customer does not object within 30 days, the utility automatically enrolls the household in the utility affordability program.

Automatic enrollment allows a utility to provide its long-term low-income assistance to a wide number of presumably-needy customers, at a very small administrative cost. The matching and letter-issuing process in New York costs between \$50,000 and \$100,000 (USD), and reaches several hundred thousand New Yorkers.

DISCOUNT RATE ENROLLMENT TRACKING SHEET

	Jan-2020	Feb-2020	Mar-2020	Apr-2020	May-2020	Jun-2020	Jul-2020	Aug-2020	Sep-2020	Oct-2020	Nov-2020	Dec-2020								
Total Customers as of the last day of the previous month	0	0	297902	0	0	298912	299102	0	0	0	0	0								
Low-income Customers as of the last day of the previous month	0	0	41062	0	0	38808	42622	0	0	0	0	0								
Number of new enrollees from data match with HHS	0	0	1720	0	0	4024	407	0	0	0	0	0								
Total Matches at Match Reason Code 1 from HHS	0	0.00%	22442	66.98%	0	0.00%	25825	67.93%	24061	67.09%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Total Matches at Match Reason Code 2 from HHS	0	0.00%	953	2.84%	0	0.00%	1183	3.11%	1110	3.09%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Total Matches at Match Reason Code 3 from HHS	0	0.00%	485	1.44%	0	0.00%	565	1.48%	543	1.51%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Total Matches at Match Reason Code 4 from HHS	0	0.00%	5313	15.85%	0	0.00%	5953	15.66%	5729	15.97%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Total Matches at Match Reason Code 5 from HHS	0	0.00%	4310	12.86%	0	0.00%	4487	11.80%	4418	12.31%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Total	0	0	33503	0	0	38013	35861	0	0	0	0	0								
Number of traditional new enrollees in discount program during the month	0	0	1735	0	0	594	270	0	0	0	0	0								
Total new enrollees in discount program	0	0	3455	0	0	4618	677	0	0	0	0	0								
Enrollees removed from discount program during the month	0	0	5709	0	0	804	463	0	0	0	0	0								
Total customers enrolled in discount program as of the last day of the current month	0	0	38808	0	0	42622	42836	0	0	0	0	0								
Percent of customers enrolled in discount program at end of month	0.00%	0.00%	13.02%	0.00%	0.00%	14.25%	14.32%	0.00%	0.00%	0.00%	0.00%	0.00%								
Percent increase (decrease) in enrollment in discount program during the month	0.00%	0.00%	-5.49%	0.00%	0.00%	9.82%	0.50%	0.00%	0.00%	0.00%	0.00%	0.00%								

# Low-Income Assistance Strategy Review

Options for the design and implementation of  
ratepayer-funded assistance programs for low-  
income electricity customers

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**Prepared for the Ontario Energy Board**

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AUTHORS

Nancy Brockway  
Jenn Kallay  
Erin Malone



**Synapse**  
Energy Economics, Inc.

485 Massachusetts Avenue, Suite 2  
Cambridge, Massachusetts 02139

617.661.3248 | [www.synapse-energy.com](http://www.synapse-energy.com)

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# 1. INTRODUCTION

Low-income consumers face a particular challenge when it comes to paying their electricity bills. A monthly electric bill of 800 kilowatt hours (kWh) – the average use for a residential customer – is \$133. For a family in Ontario with an annual income of \$20,000, this amounts to eight percent of the household’s total monthly income (Ministry of Energy 2014). To assist such customers in affording energy, many governments have put in place rate assistance, emergency assistance, and conservation programs designed to assist low-income consumers with managing their energy costs. Ontario has implemented the Low-Income Energy Assistance Program (LEAP), which provides emergency financial assistance, special billing and collection terms and conditions, and SaveONEnergy to assist consumers in reducing unnecessary electricity use.

On April 23, 2014, the Ontario Ministry of Energy (Ministry) issued a letter requiring the Ontario Energy Board (Board or OEB) to report on developing and implementing an appropriate long-term electricity rate-affordability program for low-income electricity consumers (Rate Affordability Program). The Ministry seeks to develop a program that meets the needs of low-income electricity consumers while balancing the need for just and reasonable distribution rates. The Ministry expects the new Rate Affordability Program to complement the existing Ontario LEAP elements. The new Rate Affordability Program is also expected to result in benefits for all ratepayers, i.e., “system benefits,” due to reductions in costs from fewer disconnections, reduced delinquent account management expenses, and lower amounts of bad debt losses for electricity distributors.

This report is designed to assist the Board in developing its report for the Ministry on an appropriate electricity rate-affordability program for low-income electricity consumers. This report presents research conducted on low-income energy assistance programs in various jurisdictions in Canada, Australia, the United Kingdom, and the United States. The research is intended to provide examples of low-income energy assistance programs to the Board so that they can be incorporated into the Board’s report to the Ministry.

The report is organized such that it presents a summary of the research conducted on the various programs and jurisdictions, followed by an analysis of key program elements such as program design and customer intake, and finally policy options and considerations for the Board to contemplate as it prepares its report to the Ministry.

## **2. LOW-INCOME ENERGY ASSISTANCE IN OTHER JURISDICTIONS**

### **2.1. Jurisdictions Researched**

Programs in the following jurisdictions were researched to prepare this report: Australia on a federal level, Australia's Victoria State, California, Colorado, Illinois, New York, Pennsylvania statewide, Pennsylvania PPL Electric (a distribution utility), Seattle, Washington, the United Kingdom and the United States' federal program known as Low-Income Home Energy Assistance Program (LIHEAP). We also gathered some related information on programs in Indiana, Maine, Massachusetts, New Jersey, Nevada, Ohio, Oregon, Washington, and Wisconsin. This information is presented where applicable in the report itself. Our list of references at the end of the report can assist in finding additional facts about all of these programs.

The jurisdictions we chose for research represent a diverse set of geographical and regulatory conditions resulting in a variety of programs. Geographically, the sample of jurisdictions includes provinces, cities, countries, federal programs, and state programs, all of which are in different locations throughout the world with different climates and populations. From a regulatory perspective, the jurisdictions range in utility structures (i.e., regulated versus deregulated) and in the level of oversight provided by the jurisdiction's electric utility regulatory bodies for the low-income assistance programs. From a program perspective, the selected jurisdictions range from statutorily mandated to utility-created programs and from programs that have been in place for decades to programs that are currently undergoing change to better assist customers. Program funding includes both government budgetary allotments and ratepayer funding. Such a variety of jurisdictions provides a broad assessment of the options available to the Board and Ministry when designing a low-income program for Ontario.

Additionally, the Board requested that this report present information on long-term bill assistance programs fielded by Native Americans in the United States or First Nations and Métis communities in Canada. After researching these types of programs, it was determined that limited information is available for inclusion in this report. However, one example was discovered of a Native American tribe in Oklahoma using its own funds (casino receipts) to fund an emergency assistance program (such as that contained in LEAP). Questions of affordability for these communities are complicated by the remoteness of some settlements, and the lack of a modern power supply in some areas. These issues require targeted research and analysis, and therefore are not thoroughly addressed in this report.

### **2.2. Research Areas**

A specific list of nine research areas and questions was developed to ensure consistent, pertinent information was gathered for each jurisdiction. The nine research areas are identified and explained below. Given the Ministry's letter and the Board's requirements, the research concentrated closely on the customer intake process, how low-income eligibility is defined and determined, and on the program designs. However, useful information is presented on all the research areas.

1. **Reasons for Establishing Low-Income Energy Assistance Programs and Mechanism for Adoption.** Generally speaking, the reason for establishing such programs is to provide assistance to customers in need of support, but there are other purposes, and other benefits of such programs. Related to this are the net benefits of making electricity affordable for all consumers, by improving payment patterns, reducing disconnections, and reducing credit and collections costs. In addition, low-income energy assistance programs have been established through legislation, through a utility's own initiative, and by regulatory action; this determines the mechanism for adoption.
2. **Program Design.** Programs apply different approaches for providing benefits to customers. Emergency and charitable programs (not discussed in this report) provide one-time cash assistance to prevent disconnection or help a family in distress. Energy efficiency and modified credit and collection costs are similarly part of a comprehensive package of policies to address the need for assistance to low-income consumers. In some jurisdictions, aid is provided annually in a lump sum. To provide a more permanent basis of aid for low-income customers, however, longer-term programs with more frequent distribution of benefits have been developed. Programs include flat dollar reductions off the otherwise applicable bill, percent discounts off the bills, and more targeted forms of assistance. Some provide a scale of benefits with the highest aid given to those with the lowest income among those eligible for assistance. The most precisely-targeted programs determine benefits based on the burden that the bill represents of monthly household income (e.g., the percentage of income that the bill represents).
3. **Eligibility requirements.** To ensure that assistance is provided only where it is determined to be needed, most programs allow customers to participate if they meet certain requirements, primarily related to income. A small number of programs have provided assistance to vulnerable customers without requiring a means test. Typically, the regulatory body in the jurisdiction will specify a percentage of some poverty guidelines as the maximum income for eligibility. To simplify administration but retain a means test, eligibility is often based on whether a customer is enrolled in another means-tested program. Eligibility can also be based on additional hardships faced by the customer (disability, medical issues, etc.).
4. **Intake process.** Programs have different processes for identifying, verifying, and enrolling customers into their assistance programs. Depending on the jurisdiction, a utility is not likely to conduct the majority of outreach and intake, and instead relies on government and social welfare agencies that are already performing these functions for other low-income programs. Most recently, utilities have been identifying likely participants by comparing their customer list with lists of beneficiaries of means-tested assistance. Confidentiality must be observed, and programs must decide if the customer is to be given the opportunity to opt in, or opt out, of the utility bill assistance program.
5. **Delivery mechanics/administration.** Low-income assistance programs are delivered by a range of entities including utilities, government departments, utility regulators, social agencies, or some combination thereof. The delivery channel can depend on the type of benefit the customer receives, namely reduced bills or increased income. Customers typically receive increased income from governments directly or through non-governmental organizations that provide various forms of welfare to households.

Reduced bills, by contrast, are generated by the utility. In either case, the utility usually provides credit and collection functions related to utility bill payment.

6. **Funding sources.** Low-income assistance programs are funded through a variety of sources, primarily customer-benefit charges to the utility's rate classes, as well as taxes. Sometimes programs use funds that were gathered as penalties and refunds for unsatisfactory utility behavior, or from payments to open-ended public benefit programs such as regional greenhouse gas initiatives.
7. **How funding levels are established.** Programs can have open-ended enrollment, and budgets are adjusted to meet the enrollment. Some programs have fixed budgets, requiring benefit adjustments, or closing of applications if enrollment becomes too high for the budget. Sometimes the participation targets and the associated funding levels, whether capped or not, are determined by a needs assessment. Even where program enrollment is uncapped, regulators usually supervise the level of spending and may make program changes to adjust the amount of funds dedicated to the program.
8. **Funding dedicated to program administration.** The amount of funding dedicated to program administration is sometimes explicitly limited (e.g., ten percent of all funding) to maximize the benefit to customers, although not all jurisdictions set a specific value. In most utility discount programs (whether or not burden-based), the utility administrative costs are not separated out from other operations and maintenance costs recovered in base rates.
9. **Program results or impacts.** Any information that is available about recent results or impacts of the program is provided (e.g., program uptake, number of people assisted, unanticipated benefits and/or consequences, etc.).

## 2.3. Methodology

The authors researched each jurisdiction through a literature review and through discussions with staff involved in the oversight of the low-income assistance programs in the respective jurisdictions. Specifically, the authors reviewed state-specific dockets, the United States federal LIHEAP program clearinghouse website, legislation and orders, as well as third-party research reports. All of the documents referenced are provided in the Reference section of this report.

Appendix A provides the detailed results of the research conducted for a number of the primary jurisdictions. These and other jurisdictions are referenced throughout this report in the context of the various policy options, while Appendix A provides the complete information for each state to support the policy analysis and considerations. Further, Appendix B provides the same information for each jurisdiction as provided in Appendix A, but organized by research area rather than by jurisdiction.

## 3. PROGRAM ANALYSIS

### 3.1. Reasons for Low-Income Energy Affordability Programs

#### Background and Historical Development of Assistance Programs

Low-income electricity affordability programs have been developed for many reasons by utilities, utility regulators, and governments. Generally, the reason for such programs is to make essential electricity service more affordable for people without enough money to afford a basic monthly quantity of electricity. Low-income affordability programs result from the recognition that low-income households by definition are unable to pay for all of their basic living expenses. Inability to pay, or difficulty paying consistently, often leads to consumers falling into arrears, becoming subject to collection practices including loss of service, and facing additional barriers in their attempts to have service restored.

Low-income energy assistance programs have been developed for a number of purposes, and the program designs generally reflect the purpose of the program.

Charity and community relations were some of the first types of assistance programs to be offered by utilities. Since the turn of the nineteenth century, utilities on their own motion offered discounts to customers they deemed vulnerable, particularly seniors and the disabled.<sup>1</sup> These offerings might be characterized as part of utility image-building, if not always driven by purely charitable aims.

Government energy assistance programs have also provided benefits to customers for many years. Partly in response to ever-increasing energy costs, governmental welfare income assistance programs have long included electricity service in their definition of necessities. In response to increasing costs for essential energy services, however, governments have developed publicly-funded assistance programs that were specifically designed to address the affordability of electricity and other energy needs. Examples of governmental assistance programs include Australian concessions<sup>2</sup> and allowances, the United Kingdom allowances, and LIHEAP in the United States.

#### Long-Term Assistance Programs

The Minister, in his letter directing the Board to undertake this research, stated the government's desire "to protect low-income residential electricity consumers" (Ministry of Energy 2014). The government

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<sup>1</sup> Consideration of special hardship circumstances continues to play a role in affordability programs. Proof of fuel poverty is still not necessary to qualify for allowances or discounts in some jurisdictions. This report, however, will focus on the program elements designed to make essential service affordable for low-income customers, in recognition of the gap between their incomes and the costs of essential services such as electricity, and the attendant risk of credit and collection activities and loss of service.

<sup>2</sup> "Concessions" is a term used in Australia to describe discounts or rebates provided to eligible customers for specific necessary goods and services. Some operate in a fashion similar to LIHEAP – a once a year payment to the electricity provider to be applied towards the bill. The Service to Property concession offered by the state of Victoria is a recurring monthly credit that reduces the utility bill to only the cost for energy usage when the total bill is high as a result of the customer service charge.

has already taken steps to address emergency situations, where immediate assistance is needed to forestall disconnection. LEAP eases the burden and complexity of utility credit and collection policies. LEAP also includes coordination with the SaveONEnergy Home Assistance Programs delivered by gas and electric utilities, which provides support to low-income households to improve the energy efficiency of their homes. The Minister's charge to the Board points to a component of affordability assistance that is currently missing from the Province's initiatives to protect low-income residential electricity consumers. Emergency assistance, reasonable credit rules, and energy conservation are essential tools, but cannot by themselves assure that electricity will be affordable; a longer-term approach is also needed.

The Minister has asked for options to develop a plan "that meets the needs of low-income electricity consumers while balancing the need for just and reasonable distribution rates" (Ministry of Energy 2014). The experience of other jurisdictions facing this challenge can help inform the range of options available to Ontario.

Utilities, their stakeholders, regulators, and legislatures have in the last 40 years developed assistance and affordability programs that are increasingly more broad and detailed. As utility service became more expensive in the last quarter of the twentieth century, regulators began approving rate discounts and other long-term forms of low-income assistance with costs recovered from ratepayers as a cost of service.

Purposes of long-term utility assistance initiatives have included, without limitation:

- meeting the energy needs of low-income households,
- easing the burden of energy costs on low-income households,
- fostering equality in energy burdens as a percent of household incomes,
- preventing disconnections, mitigating the impacts of price spikes and similar emergencies,
- promoting improved bill-payment behavior,
- reducing utility credit and collection costs,
- maximizing net revenue, and/or
- protecting customers with special needs for electricity.

### **Affordability Programs and Utility Business Models**

A major trigger for introducing or strengthening a low-income affordability program has been a spike in electricity prices. As examples, in Victoria State, a 13.5 percent concession was introduced for off-peak prices when, in the early 2000s, off-peak prices increased sharply. Similarly, the Federal Australian carbon tax legislation included a new Household Assistance Package to assist households to help meet

expected price rises due to the introduction of a price on carbon.<sup>3</sup> The Ohio Commission first justified its approval of a percentage-of-income payment plan (PIPP) when the state was faced with an emergency – rising customer bills that put increasing numbers of low-income customers at risk of disconnection.

Another spur to the development of affordability programs was the introduction of retail competition. In the mid-1990s, policy makers in Commonwealth countries, the United States, and elsewhere considered whether to replace the vertically-integrated structure of the electric industry. Many legislatures that deregulated the supply portion of their electric industry included explicit statutory mandates to protect low-income consumers; they were felt to be least likely to benefit from competition, and advocates successfully argued for affordability and efficiency programs to mitigate their expected disadvantage.<sup>4</sup>

Similar protections were built into the National Energy Market (NEM) negotiated by Australian stakeholders, which formed the basis for utility deregulation in that country. The NEM provided for assorted Community Service Obligations (CSOs). CSOs are requirements to deliver targeted assistance to consumers. In the United States, 22 states that restructured their electric utilities industry included a mandate for universal service programs and funding in their restructuring legislation. Where low-income programs were already in place, the legislation preserved or expanded the existing funding for such universal service programs. (NCLC 2014, Section 7.2.7.1, p. 212).

Regulators have also turned to affordability pricing upon observing that traditional credit and collection practices generally do not produce the desired results in the case of low-income customers. A survey of payment-troubled customers of a large Wisconsin utility revealed that only about 14 percent of customers in arrears had sufficient disposable income to pay the bill in response to a shut-off notice (Grosse 2008). Most of the rest of the payment-troubled customers simply did not have enough income to pay for the bare necessities of life.<sup>5</sup> The utility realized that using an unforgiving method to induce payment by those customers was counterproductive.

In line with this insight, the Pennsylvania regulatory commission approved long-term low-income assistance programs for all large electric and gas utilities. The reasons provided by the Pennsylvania commission in approving its burden-based Customer Assistance Program (CAP) are representative of the reasons regulators in the United States initiated or approved such programs:

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<sup>3</sup> With the repeal of the carbon tax effective July 1, 2014, the Australian government revised the Clean Energy Supplement, which had been paid automatically to pensioners, families who receive family assistance, and others on government income support. The Clean Energy Supplement was a “sweetener” added to household assistance when the carbon tax was enacted. Originally proposed to be eliminated when the carbon tax was repealed, it was retained, and renamed the “Energy Supplement.” In addition, the rate of payment as of June 30, 2014 was fixed for future payments, rather than increasing in future as had been the case with the Clean Energy Supplement. (Conversation 2014).

<sup>4</sup> As of 2010, 22 states and the District of Columbia had enacted some form of electric and/or gas utility restructuring legislation. None of the United States has adopted restructuring legislation since 2000, and seven states that had initially passed restructuring legislation have retreated through legislation or regulation (Arizona, New Mexico, Nevada, California, Arkansas, West Virginia, and Oklahoma). (NCLC 2014, Section 7.2.7.1, pp. 211-212).

<sup>5</sup> A small number of other customers likely had sufficient funds, but needed help managing a household budget. The utility provided education, information, and referrals for this group to address the underlying reasons for non-payment.

We, in conjunction with utilities, and social service agencies, have all worked hard to devise ways to [e]nsure that low-income Pennsylvanians have utility services which really are necessities of life as the tragic fire deaths associated with the loss of utility service underlined. . . “However, for the poorest households with income considerably below the poverty line, existing initiatives do not enable these customers to pay their bills in full and to keep their service. . .

Consequently, to address realistically these customers’ problems and to stop repeating a wasteful cycle of consecutive, unrealistic payment agreements that cannot be kept, despite the best of intentions, followed by service termination, then restoration, and then more unrealistic agreements, we believe that new approaches like PECO’s CAP program ... should be tried.” (PA PUC v EGC 1990, p. 63).

## **3.2. Benefits of Low-Income Assistance Programs**

### **Affordable Rates can Bring Higher Net revenues**

Another reason for implementing assistance programs is that they can provide benefits not just to the customer participating in the program, but to the utility, to the utility system, and customers in general.

One barrier to more affordable rates has been the misperception that lowering billed revenues to low-income customers automatically reduces a utility’s net revenues, and by the same amount. Affordable rates provide savings in many aspects of utility operations. In the 1990s, Roger D. Colton (Mr. Colton), then of the National Consumer Law Center now at Fisher, Sheehan, and Colton, began analyzing how reduced rates to low-income customers created savings in credit and collection costs, working capital, and other costs. These savings have helped demonstrate that low-income assistance is not unreasonably discriminatory, which has led to wider support for such programs. Following the example of energy efficiency cost-benefit analysis, analysts have also identified additional non-energy benefits, which in turn lend further support to the institution of low-income energy programs.

It may appear counter-intuitive, but charging an affordable rate may enable a utility to receive greater net revenues than charging an undiscounted rate. An affordable rate improves the payment patterns of the participating customers; a greater percentage of participants pay a higher percentage of their bills than do non-participants. This in turn can lead to higher total net payments; a higher percentage paid of a lower bill can produce more revenues than a lower percentage paid of a higher bill. More customers can and do pay the affordable bill than the unaffordable bills. Results from impact analyses of two affordability programs provide an example of this effect, as summarized in Table 1, below. In one study, the analyses confirmed that it is possible to charge less to a customer group and receive more revenue. (Colton 2010, Table 19).



**Table 1. Billings and Revenues under Utility Rate Affordability Program – Citizens Gas and Coke (2007)**

Population	Billed Revenue	Collected Revenue	Collected Revenue / Billed Revenue
Customers on Discounted Rates	\$273,527	\$215,897	79%
Customers on Standard Rates	\$304,072	\$194,577	64%
Ratio of customers on Discounted Rates / Standard Rates	0.90	1.11	

From the results one can see that the participants were billed only 90 percent of the revenue that non-participants were billed. However, the utility collected almost 80 percent of the revenue billed to participants. By contrast, it collected only about two-thirds of the revenue billed to non-participants. The participants' higher payment ratio more than overcame the revenue impact of their lower billings.

A recent evaluation of the Xcel Pilot Energy Assistance Program in Colorado (PEAP) found that program participants paid two-thirds of their current bills, whereas PEAP-eligible non-participants paid slightly over half of their billing. According to the evaluation, rather than collecting only \$533,684 from customers without the PEAP rates, Xcel Energy collected \$701,278 from customers enrolled in PEAP. That is, their bills were reduced below the otherwise applicable residential rate, but the revenue they provided was more than \$167,000 above what these customers would have paid without the PEAP assistance. (Colton 2010, p 89).

A 2006 evaluation of a New Jersey program found that customers were able to pay a higher portion of their bills when the bills were kept at or below an affordable burden:

[M]ore than 80% of households with a [net energy burden] below 3 percent covered 100 percent or more of their annual bill. Less than 60 percent of households with a [net energy burden] at or above 8 percent covered 100 percent of their annual bill. (Colton 2010, p. 51).

Put another way, more than 25 percent of participants with energy burdens greater than eight percent of their income paid between 50 and 90 percent of their bill. In contrast, only six percent of participants with energy burdens between two and three percent of their income paid similar portions of their bills. (Colton 2010, p. 51).

In Pennsylvania, the commission determined that the Equitable Gas affordability program cost was substantially less than the uncollectible expense associated with program participants. Customers eligible to participate in the Equitable Gas program who had payment arrangements either negotiated by the Commission's Bureau of Consumer Services or by the Company paid on average "little more than 50 percent of the presubscribed amount." The commission concluded that the evaluation suggested that "the \$1.8 million future test year [program] expenses should result in an overall reduction to the Company's cost of service, through its uncollectible expense and savings in credit and collection expenses." (PA PUC v EGC 1990, p. 71).

Pursuing standard collection practices causes the utility to spend money on ultimately fruitless efforts. The relative inefficiency of a traditional collection processes (delivering unaffordable bills, sending late

and disconnect notices, and disconnecting customers unable to pay in full and on time) is manifest in the level of activity that it takes to achieve a reduction both in dollars of arrears and in the number of accounts in arrears.

A study of utility affordability in Manitoba investigated some of the tasks involved in pursuing payment the traditional way. Looking at the patterns of payment between 30-day arrears and 60-day arrears, the study observed that Manitoba Hydro without an affordability approach has to handle between five and ten collection calls for every \$1,000 reduction in arrears. To prevent 30-day arrears from becoming 60-day arrears, the Company must handle between 1.3 and 2.1 collection calls for every such account. (Colton 2010, p. 21).

A number of regulatory commissions have found that affordability programs brought to them for approval were cost-effective, including Colorado, Pennsylvania, Ohio, Maryland and Missouri. (CO PUC 2000, pp. 13-21; PA PUC 1992, p. 2; OH PUC 1983; MD PSC 2003, pp. 17-18; WGLC 2005, p. 2; MI PSC v UEC 2002).

In Maryland over the 2004-2005 heating season, the arrearages of customers who were not participants but whose income was low enough to qualify for a utility affordability program increased at a rate that was three times higher than the rate of increase for arrearages for program participants. The utility, Washington Gas Light, said that the trends viewed over time were encouraging: "...even over the short period of time that the ... Pilot Program has been in effect, there appear to be positive trends" among eligible customers with respect to Pilot Program participation levels and the levels of average account arrearages." Similarly, the Maryland commission staff observed:

... the total number of [Pilot] customers in arrearage decreased significantly. There is a correlation between an increase in customer arrearage and an increase in commodity gas prices. The decrease in number of [Pilot] program participants in arrearage shows that the program is effective and is actually reaching its goals of keeping low-income customers on service and promoting positive payment patterns, which in turn trickles to other firm customers by lowering collection costs and other costs associated with charge-offs. (PA PUC 1992, p. 2).

Whether an affordability program increases net costs depends on the program, and is an empirical question. A 2007 review of a number of evaluations of low-income affordability programs gathered data on the credit and collection savings identified by the evaluations. The savings on credit and collections costs were typically modest, and did not offset the entire amount of foregone billings, but they were not insignificant. (APPRISE 2007, p. 81).

The analysts found that having an equal payment per month for program participants was important in improving participant payment behavior. One program reviewed in the 2007 study showed a statistically significant increase in bill payment regularity – this program was unique in that it put participants on an equal monthly payment plan. Arrearage forgiveness also made significant contributions to affordability, which in turn improved payment patterns as a component of an affordability program. (APPRISE 2007, pp. 90-91).

The authors of the 2007 study highlighted that the evaluations they reviewed could not determine whether the program increased payments and reduced costs more than the amount of revenue not billed because of the affordability benefit. They observed that:

To measure cost neutrality, a program would have to measure the net cost of services for customers prior to enrollment (cost minus payments) compared to the net costs after program enrollment. Further, the analysis would require an experimental design where customers in similar situations were randomly assigned to test and control groups. Utility cost of service information is generally inadequate to measure true service delivery costs. Additionally, programs that we have researched have not employed an experimental design. Therefore, we have not found any evidence to either support or refute the hypothesis that programs can be cost neutral. (APPRISE 2007, p. 94).

### **Reducing Disconnections**

Utility affordability programs have the benefit of enabling customers to maintain service and avert disconnection. For example, Indiana utilities studied the impact of a low-income affordability program on the disconnection of service by comparing participant's disconnections to non-participant disconnections. The utilities also compared the rate of disconnections for participants to the rate of disconnections for the entire residential class. In both cases, the utilities' affordability program was more effective in achieving uninterrupted service than the traditional collections approach. (Colton 2009, pp. 87-88).

The affordability approach reduced the rate of disconnections of program participants to close to the rate for all residential consumers. The evaluation further found that the rate of disconnections of program participants in arrears was lower than the rate of disconnection of the entire residential class.

The evaluation also compared the rate of disconnection for program participants to the rate of disconnection of low-income customers not receiving payment assistance. Not surprisingly, customers paying more affordable rates experienced a decrease in disconnections, while low-income customers not receiving bill assistance continued to see an increase in the number of disconnections. (Colton 2009, p. 88).

### **Non-Utility Benefits**

Reducing disconnections has many benefits for society. Stinting on other necessities to keep utilities on, low-income households may reduce the household food consumption to levels not healthy for their children. This in turn has led to higher rates of childhood malnutrition (Frank 1996; Bhattacharya 2003). Loss of utility service is also a frequent cause of a low-income family having to move, or even to become homeless. For example, in surveys of individuals living in Philadelphia emergency shelters, eight percent of respondents cited disconnection of utilities as the reason for their homelessness. Similarly, a study of homelessness in Northern Kentucky showed that utility shutoffs were among the primary causes of homelessness in that region (Woods 1990, p. 2).

Further information about the effects of fuel poverty is gathered periodically by the National Energy Directors Association (NEADA), an association of national Low-Income Home Energy Assistance Program delivery organizations in the United States. NEADA conducts surveys of LIHEAP recipients to document the experiences of the families and how they are coping with high energy prices and whether or not higher funding levels are helping to reduce arrearages and shut-offs for those families receiving assistance. The 2011 National Energy Assistance Survey documented impacts of the unaffordability of energy bills, the need for LIHEAP, and the choices that low-income households have to make when faced with unaffordable energy bills. According to the survey, nearly 90 percent of LIHEAP recipient households have at least one vulnerable member—defined as someone age 60 or older, age 18 or younger, or disabled. The survey paints a picture of households at risk:

- 40 percent have someone age 60 or older,
- 72 percent have a family member with a serious medical condition,
- 26 percent use medical equipment that requires electricity,
- 37 percent went without medical or dental care,
- 34 percent did not fill a prescription or took less than their full dose of prescribed medication,
- 19 percent became sick because the home was too cold,
- 85 percent of people with a medical condition are seniors (Choate 2011).

Unaffordable electricity and resulting loss of service have also caused dangerous conditions in low-income households and neighborhoods. In October 2013, for example, three children died in a fire started by the candle the household was using for light after the utility disconnected service for non-payment. The building suffered heavy smoke and fire damage and some other occupants had to leave their apartments. The parents were in the process of making payments towards the bill, but the utility had followed its regulator-approved protocol of notice and disconnection. (Sanders 2013; Ahrens 2001, p. 55). Similarly, where gas for heating is shut off, residents often resort to heating with electric ovens or substandard electric space heaters, each a safety hazard. In the United States, 120,000 fires are caused annually by supplemental heaters. These fires kill 600 people every year, and represent 22 percent of all residential fires. (US CPSC).

### **Affordable Bills Bring Benefits**

Any mechanism that enables low-income customers to avert disconnection by lowering the customer's bill will tend to produce the expense savings and non-energy benefits described above. Thus, the energy efficiency portion of LEAP already helps make electricity more affordable for some customers, and produces associated benefits. In most situations, however, conservation alone will not reduce usage far enough to produce an affordable bill. The key is making sure the bill is low enough for the customer to be able to pay it.

The more a program can make bills affordable, the greater the customer, utility, and societal benefits. As discussed below, burden-based affordability programs do the best job of matching bill with affordability. This is particularly the case if they are linked to the household's situation: level of poverty based on income, numbers in the household, and perhaps other variables (rural/urban for example). At the same time, however, the better a program tailors the bill reduction to the actual burden on each household, the more administrative resources will be required to calculate this burden and translate it to a bill reduction. These costs will undermine at least some of the expense savings achieved through affordability. Policy makers have to determine the balance between targeted assistance and other *desiderata*. This issue is further discussed below in the context of program design and administration.

### 3.3. Program Design

Long-term low-income utility affordability programs can be categorized into a few standard designs: flat dollar per month bill reduction, percentage reduction in bill, and burden-based billing.<sup>6</sup> The advantages and disadvantages of each of these types of programs, as well as others, are discussed in detail below.

#### Annual Cash Equivalent Payment

Some programs provide an annual supplement to offset energy costs, in addition to benefits already provided by other government programs.

In a small number of the United States, moneys collected from ratepayers by statute are turned over to a government agency, and bundled with an annual benefit that is paid to the participant's energy supplier to help pay for annual energy costs. Usually utility moneys are added to the federally-funded LIHEAP. The funds are administered by the agency that administers the LIHEAP program. In effect they are mingled with the federal and state LIHEAP grants, and are a further source of funding for that program. LIHEAP is distributed to program participants once a year in a lump sum.<sup>7</sup>

The United Kingdom and most Australian concessions and allowances work in a similar way, but are not supplemented by ratepayer moneys.

Once a year benefit programs, however, lack a number of important characteristics. They ignore the reality that for most low-income customers it can be virtually impossible to save money; this leaves little opportunity for the customer to evenly distribute a lump sum benefit over the course of the year. Often the customer accrues arrearages waiting for such a lump sum benefit. Also, a lump sum payment does not provide equal monthly billing or opportunities to earn arrearage forgiveness for regular payment of current bills. These features have been shown to be important for improving affordability.

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<sup>6</sup> Burden-based rates are tied to the impact of the rates on the household, rather than to the allocated costs of the utility. The burden is usually defined as the percent of income the household must use to pay for electric or gas utility bills. Programs reduce the bill to a level deemed affordable, by crediting or discounting the bill.

<sup>7</sup> LIHEAP is not an entitlement – households are not guaranteed a LIHEAP benefit if they meet the criteria for receiving such a benefit. There are statutory requirements that target available aid to certain vulnerable households, but once funding for a year has been exhausted, no further benefits are distributed.

## Reduce or Eliminate Monthly Customer Charge

In New York and Victoria State, the bill is made more affordable by reducing or eliminating the flat per-month customer charge.<sup>8</sup> This reduces the overall bill, but has rate design effects as well. The effective per kWh rate paid by customers after the application of a customer charge reduction will vary depending on the consumer's usage level. Lower-usage customers will see a higher percentage reduction of their effective per kWh rate than higher-usage participants if both receive the same flat dollar per month reduction in bills.

Reducing the customer charge is likely to provide more relief to lower income customers, as a large portion of them use less electricity. On the other hand, some low-income families use large amounts of electricity, whether because their families are large; or their housing is old, cheaply built, or inefficient; or they have a medical need for electricity to support equipment, refrigeration, or space conditioning. Reducing the customer charge can provide important affordability assistance to many vulnerable customers, but it produces an inexact match of need and assistance. Utilities can easily apply the benefit to participant's bills, leaving the intake process as the main administrative cost.

## Percentage Discount on Rates or Bills

Many utilities apply a common percentage discount to the overall bill (or the distribution part of the bill in some restructured jurisdictions). This form of assistance is relatively easy for a utility to calculate: calculate the bill as usual, then apply the designated percentage reduction, and render the discounted bill. As with reduced customer charges, this approach is fairly easy to administer, all participants enjoy the same percentage discount, and no further data need be collected for monthly billing than the usage of the household.

As can be seen from the example below in Table 2, a flat dollar benefit will reduce the effective unit rate paid by low-use customers more than that of high-use customers. By contrast, a fixed percentage discount off the entire bill will reduce the effective rate paid by higher-usage participants to a greater extent than the rate paid by lower-usage participants.<sup>9</sup>

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<sup>8</sup> Residential bills often are made up of a flat monthly charge intended to provide a contribution to the fixed costs of connecting a customer, and a volumetric charge (e.g., per kWh) to recover the balance of allocated costs.

<sup>9</sup> The example is purely hypothetical. The percent reduction was estimated by determining the unit rate that, over 800 kWh, would produce a \$10 benefit.

**Table 2. Impact on Program Benefit of Different Program Designs (Example)**

Customer & Program Details	Flat Monthly Benefit (\$10/bill)			Per kWh Benefit (\$0.0125/kWh)		
<b>Rate and Bill Overview</b>						
Usage (kWh)	400	800	1500	400	800	1500
Per kWh rate	\$0.16	\$0.16	\$0.16	\$0.16	\$0.16	\$0.16
Monthly customer charge	\$5	\$5	\$5	\$5	\$5	\$5
<b>Pre-Benefit Rates and Bills</b>						
Total bill	\$69.00	\$133.00	\$245.00	\$69.00	\$133.00	\$245.00
Effective rate	\$0.173	\$0.166	\$0.163	\$0.173	\$0.166	\$0.163
<b>Post-Benefit Rates and Bills</b>						
Total bill	\$59.00	\$123.00	\$235.00	\$64.00	\$123.00	\$226.25
Effective rate	\$0.148	\$0.154	\$0.157	\$0.160	\$0.154	\$0.151
<b>Program Benefit</b>						
Total bill	\$10.00	\$10.00	\$10.00	\$5.00	\$10.00	\$18.75
Effective rate	\$0.025	\$0.012	\$0.006	\$0.013	\$0.012	\$0.012

### Burden-Based Programs

Better matching of bills with need can be accomplished by adjusting the assistance so that it is based on household size and income. The objective is to bring the electricity cost burden of the household down to what is considered an affordable level.

The same dollar expenditure for a low-income household will consume a greater portion of available income than that same expenditure does for a household with higher income. The lower-income household thus has relatively fewer resources remaining for other necessary expenses after paying the same energy bill as that of a higher-income household. The difficulty of paying the energy bill is heavier for such a household, and this burden limits the household’s ability to afford other necessities more than the same bill will burden a higher-income household. Using a percent of income measure recognizes this fact. To put the impact of bills on low-income customers on a comparable plane to the impact of bills on high-income customers, or to a percentage deemed affordable, the burden of the bill is measured, rather than the absolute level of the bill. Thus, a higher-income household must have a higher energy bill to have the same *burden* as a lower-income household.

Three types of burden-based programs have evolved: straight PIPPs, fixed-credit PIPPs, and tiered discounts. In a straight PIPP, the dollar value of an affordable burden is calculated for the customer, and this is the amount the customer pays each month.<sup>10</sup> The maximum percent of income considered affordable is determined as a program design feature, and applied to each household’s income to derive the dollar energy bill that is at or below the maximum affordable amount. Thus, a customer with an annual income of \$8,000 who is required to pay six percent for home energy (including heating) will be expected to pay no more than \$480 per year for energy. The required household payment is determined

<sup>10</sup> Additional characteristics beyond household size and income can be included in the matrix as well.



by applying the burden limit to the income, as follows:  $\$8,000 \times 6\% = \$480$ . So long as the income level does not change, the burden limit will produce the same bill payment obligation, regardless of usage. The monthly bill will be derived by applying the six percent limit to whatever the bill would have been without the affordability program. The bill will accordingly increase or decrease as usage (and thus the underlying bill amount) adjusts.

Under a fixed credit PIPP approach, the annual income, usage, associated undiscounted bill, and required dollar reduction are determined, as in the case of a straight PIPP. However, rather than limit the monthly bill to the resulting percent of income, the benefit is provided in the form of a fixed dollar amount each month. So long as the customer's usage remains the same (and the underlying rates do not change), the customer will see the same net bill each month.<sup>11</sup> The customer's bill would increase, however, if the household uses more energy over the year than estimated when developing the credit.

Tiered discounts apply the limiting percent of income to groups of low-income customers, rather than specifically to each participant. The impact of the burden in light of the income level of the household is approximated, rather than defined customer by customer. A greater benefit is provided to customers whose income is further below a determined poverty level. Low-income customers are divided into tranches, and the lower the range of income, the higher the discount rate applied. The discount is derived by applying the burden limit to the average bill of the customers in the tranche, and using that discount for all the participants in the tranche. Thus, tiered discounts lower the bill to the desired percent of income only for those whose usage (and thus bill) is the same or lower than the median usage (and bill) of the tranche of customers within which the household is grouped.

Whatever the means by which the bill reduction is achieved, PIPPs require a decision as to the maximum affordable burden a household may be expected to carry. There are a number of ways to determine such a level, and there is no single method that is universally used.

Dr. Colton has recommended using an affordability standard of six percent of income. He derives that standard by combining the widely-held view that a household can afford to spend about 30 percent of income on shelter costs with the observation that about 20 percent of shelter costs are used for energy bills; the affordable residential energy burden is thus  $30\% \times 20\% = 6\%$  of income. APPRISE – a non-profit research institute dedicated to collecting and analyzing data and information to assess and improve public programs – has proposed definition of “high energy burden.” The APPRISE approach identifies a severe shelter burden as 50 percent of income or more, with energy costs at about 22 percent of shelter

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<sup>11</sup> There is little information available on the so-called “rebound” effect postulating that lower bills will spur greater usage. There is some evidence that the relationship may be the other way – lower bills result in lower usage – where bill assistance receipt is tied to participation in an efficiency program. For example, UGI Utilities in Pennsylvania charge its bill assistance customers an equal payment each month, based on a calculation of burden. The usage of customers in this program did not increase as a response to lowered bills. (APPRISE 2012, pp. v, x).

costs. Using this approach, APPRISE estimates the figure of 11 percent of income as an indicator of high energy burden:  $50\% * 22\% = 11\%$  of income. (APPRISE 2007, pp. 15-16).<sup>12</sup>

Another approach is to define the maximum affordable percent of income as equivalent to the actual average burden carried by non-low-income residential customers. Thus, if the median income family spends three percent of its income on electricity, the bills of low-income households should be brought down to the same percentage or less of their household income. The percentages can be calculated separately for households heating with electricity and for those that do not heat with electricity. This approach is considered by some to be more equitable than more tailored reductions, in that “rich and poor” are treated the same. But by the same token, differences within the target group of customers are left out of the design.

### **Other Considerations**

If a utility or regulator must limit the budget<sup>13</sup> for a program, the main choice presented is whether to provide a small amount of assistance to the widest possible number of people, or exclude some from the program so as to be able to give a substantial amount of assistance to a smaller number of people. The latter approach will better enable the program to achieve affordability, at least for the limited number of participants. On the other hand, a smaller dollar bill reduction will still be valuable, and assist many low-income customers in achieving better payment patterns and reducing hardship.

It is also worth noting that arrearage management has become an increasingly valuable component of a long-term affordability program.<sup>14</sup> Under an arrearage management program, a customer who pays the affordable bill going forward earns the forgiveness of some share of past-due balances. Participants who do not continue payment of their affordable bills no longer enjoy the arrearage forgiveness, and are returned to the general population for the traditional billing and collection procedures.

In New Jersey, a program required participants to pay down pre-program arrearages on top of their affordable bill. Participants were required to pay bills higher than the amount deemed to be affordable, and as a result did much worse than those whose bills did not exceed the affordable percentage. (APPRISE 2006, p. 66).

Some consider this opportunity to “earn” forgiveness of past due balances an essential component of a long-term affordability program. However, it is beyond the scope of this report to analyze all the nuances of arrearage management programs.

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<sup>12</sup> The authors suggest that burden limits developed in this way can be refined by varying the formula by level of poverty, and by the presence of vulnerable persons in the household (such as elderly individuals, or children under age 12) (APPRISE 2007, pp. 17-18).

<sup>13</sup> “Budget” is used here to refer to the extent by which billed revenues are reduced below non-discounted bills, without regard to offsetting savings or non-utility benefits.

<sup>14</sup> Without limitation, the following jurisdictions include arrearage forgiveness as part of their affordability program: Ohio, Maine, Massachusetts, New Jersey, and Maryland.

## Examples of Program Design

Table 3 below lists a number of affordability programs and characterizes their various means of lowering the bills of participants.

In addition to the programs listed in Table 3, it should also be noted that many affordability programs include, or are companions to, low-income energy efficiency and emergency assistance programs, such as those offered today in Ontario under the LEAP program.

**Table 3. Summary of Program Designs**

Jurisdiction	Design
Australia: Federal	Once per year grants paid to utility on consumer's behalf
Australia: Victoria	Once per year grants paid to utility on consumer's behalf. Cents per day reduction on service-to-property (customer) charge. Waiver of fee for transferring to new supplier
California	Flat 30-35% discount [CARE and FERA] off inverted block rates. Reduced charges for medically need by adjusting usage amounts.
Colorado	PIPP-adjusted rates [to make bill 3% of income on electric; 3% on gas]. Includes arrearage forgiveness program.
Indiana gas utilities	Tiered rate discount. Value when combined with LIHEAP = discounts of 27%/40%/50% or 35%/ 50%/60%, depending on utility. Percentages in inverse proportion to income tranches. Designed so that resulting bills to low-income approximate affordable home energy burden for households with average incomes and usage levels. Includes arrearage forgiveness program.
Maine	CMP provides fixed credit, based on household income and electricity usage (ME Need Help Paying Bills 2014).
Maryland	Benefit = Annual kWh usage x Average Cost per kWh x Utility Index x poverty level percentage. Usage figure = average usage for that tier. Benefits adjusted annually to maintain budget set by statute (plus any additional funds received, e.g., from RGGI). Percent of bill discounted based on household bill (up to a limit), and level of poverty. In 2012, averaged 35% for those at 0-75% FPL, 30% if 75% -110% FPL, 25% if 110% -150, 17% if 150% -175% FPL, and 14% for families living in Subsidized Housing. Includes arrearage forgiveness program.
Massachusetts	Fixed percentage discounts based on pre-restructuring discounts- moving towards common %. Now 25-35%. Also offers arrearage forgiveness program.
New Hampshire	Tiered rate discount. Benefits and participation are subject to availability of funds. The discount is from 9% to 77% depending on gross household income, household size and electricity usage (PSNH 2014).
New Jersey	Monthly augmentation of LIHEAP, amount determined by annual PIPP calculation. Includes arrearage forgiveness program.
Nevada	Increase to annual LIHEAP grants.
New York	Flat dollar reduction in overall bill.
Pennsylvania	Varies. PPL Electric has 3 methods to calculate most affordable rate – Minimum bill, Percent of Bill Income Tiers, and specially calculated. Customers pay fixed dollar amount per month. CARE usually includes arrearage forgiveness program.
Ohio	Straight % of income PIPP. Includes arrearage forgiveness program.
Oregon	Increase to annual LIHEAP grant.
US Federal (LIHEAP)	Once per year and monthly grant paid to utility on consumer's behalf.
United Kingdom	Once per year and monthly grants paid to utility on consumer's behalf.

### 3.4. Eligibility Requirements

#### Defining Low-Income

The key question in determining eligibility is how to define “low-income.” The objective of many programs is to help vulnerable customers such as seniors, disabled persons, persons dependent on electricity for health and safety. These programs do not always include poverty or fuel poverty as a condition of eligibility.<sup>15</sup> But if the objective is to make bills affordable, some measure of poverty is required.

Income-eligibility has many parameters, not all of which are included in any given program’s eligibility criteria. There is the income of the household, of course; while the bill is in one person’s name, it is fair to take into account all the income that can be used to support the household’s electricity use. Also, the same income can be livable for a single person but wholly inadequate for a family of five. Electric needs can be different for young healthy adults than it is for elders, infants, or disabled persons who are more dependent on the functions electricity makes possible in the home, such as space conditioning. Having a higher income limit for such vulnerable households can be appropriate, as it recognizes that their needs are greater and that they are not likely able to increase their means.

#### Low-Income Guidelines in Canada

Canada has no formal definition of low-income, and various measures are used for various purposes. Statistics Canada periodically publishes calculations of three different low-income lines: the Low-Income Cut-Offs (LICOs), the Low-Income Measures (LIMs) and the Market-Basket Measures (MBMs).<sup>16</sup> As Statistics Canada states in the abstract of its most recent report, these measures “are not measures of poverty, but strictly measures of low-income.”

The LICOs define the income thresholds below which a family will likely devote a larger share of its income on the necessities of food, shelter, and clothing than the average family. LICOs are derived by estimating the income threshold at which households are expected to spend 20 percent more than the average household on basic necessities of life (food, shelter, and clothing). The 20 percent reference is based on the “rationale that a family spending 20 percentage points more than the average would be in ‘straitened circumstances’” (Statistics Canada 2014, note 1). The average-household spending levels are derived from data in the Family Expenditure Survey. LICOs are separately estimated for households of different sizes and located in areas with different living costs.

The LIMs are based on the distribution of household income across the Canadian population as a whole. They are estimated according to international standards. The LIM is set at 50 percent of the median

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<sup>15</sup> Programs in Australian and the United Kingdom are more likely to focus on vulnerability as a key concern (see, e.g., Deloitte and Touche 2013, p. 8).

<sup>16</sup> The most recent Low-Income Line published by Statistics Canada is for 2011-2012 (Statistics Canada 2014).

adjusted household income for families of different sizes. The income data is taken from a household survey.

MBM is based on the cost of a basket of goods and services needed to sustain a modest, basic standard of living, including the costs of food, clothing, footwear, transportation, shelter, and other expenses, for a reference family of two adults aged 25 to 49 with two children (aged 9 and 13). The MBM distinguishes between the costs of the market basket between locations of different densities in the different Provinces. In this way, it provides thresholds for a finer geographic level than the LICO. Low-Income status is determined by comparing a household's income to the market basket cost for households of the same size in the same geographic area. The Canadian low-income lines do not include a separate means test, although the market basket measure is differentiated by homeowner mortgage status.

### **Low-Income Guidelines in the United States**

The Federal Poverty Guidelines, or Federal Poverty Limit (FPL), published annually for the United States by the Department of Health and Human Services, is the standard guidelines for many United States programs, although it is typically adjusted by states. The guidelines state a household income limit for households of different sizes, and provide a cut-off for eligibility for some federally-funded programs. They are often used by state and local governments and utility regulators as the starting point in identifying income eligibility limits for means-tested benefit programs. While they are duly published in the Federal Register, they are not an official United States government definition of low-income. In fact, they are so widely as outdated that few social welfare programs use the income limits as published. Rather, program eligibility based on the FPL is typically set at some multiple of the FPL for any given household size.

For many years, the common upper limit to define a low-income household in the United States was 150 percent of the FPL. More recently, programs have specified higher limits, such as 185 percent (e.g., Vermont) or 200 percent (e.g., New Jersey, California) (VT LIHEAP 2014; NJCR 2014; CA AB 327). Other measures have come into use as well, particularly percentages of an area's median household income. States can make their grants for federally-funded LIHEAP benefits available to households with incomes no greater than 60 percent of the state median income (NA LIHEAP 2014, p. 7). For non-LIHEAP programs, higher percentages of the median income have also been used to define the boundary between low-income and non-low-income households. These higher limits have been adopted with the recognition that the FPL is both outdated and flawed in a number of other ways, most importantly being the failure to adjust the line for costs of living, except to give Hawaii and Alaska separate lines. In effect, the poverty line varies by jurisdiction and by enabling legislation, and there is usually some effort to avoid the shortcomings of the FPL.

### **Leveraging Other Means-Tested Programs**

Where many low-income households are recipients of one or more means-tested benefits, the income test for that program can be used to define the maximum income for participation in a low-income

electricity affordability program. In Australia, holders of most federal “concession cards” are deemed eligible for the various utility bill assistance offerings (Harmer 2009, p. 122).

In the United States, it is common to declare recipients of Supplementary Security Income (support for aged, blind, and disabled low-income persons), Transitional Assistance for Needy Families (more popularly known as “welfare”), Supplemental Nutritional Assistance Program (SNAP) benefits (historically called “food stamps”), LIHEAP, and other means-tested programs as “categorically eligible” for other means-tested programs. A low-income program might be open to the categorically eligible, and also admit persons whose income relative to the FPL or the median income for the area are deemed below the defining limit of low-income.<sup>17</sup>

If an affordability program is limited to those whose income has already been verified by another agency, it is economic to piggy-back on that determination. The cost of intake and income verification can be a major component of the costs of administering a utility low-income rate. At the same time, limiting participation to those who meet the eligibility guidelines of other programs will necessarily exclude some households whose income is too low to afford basic electricity, but who do not meet some other eligibility criterion of those other programs. Program designers must choose among a set of options: expand eligibility to capture all who find electricity unaffordable, or keep administrative costs low and rely solely on the income-verification already performed by other agencies.<sup>18</sup>

## **Other Considerations**

Within wider definitions of the eligible low-income population, program designers may wish to focus limited funds to groups deemed particularly at risk or otherwise deserving. To accomplish this, administrators will need an outreach plan, to avoid the situation where the first-come applicants are not in the target population, but exhaust the total benefits available. Groups that an electricity low-income program might wish to target have included households with senior members, households with young children, households with medical needs, and households who might not hear about and apply for the program absent such outreach. Such populations include those with language barriers, those living in remote areas, native populations, and others who are not likely to be first in line to apply.

## **3.5. Intake Process**

### **Utility and Community-Based Organization Roles**

Since utility long-term bill affordability programs usually take the form of a special rate or tariff, utilities often perform outreach and intake functions as part of their operations. It has also become common for additional utility program intake to be contracted to a community-based organization or a government

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<sup>17</sup> Most of these federal/state programs are administered at the state level.

<sup>18</sup> To further complicate the choices, some of these means-tested programs have asset tests. One can debate the fairness and usefulness of applying asset tests without coming to a firm conclusion. As with most eligibility criteria, assets tests are both under- and over-inclusive of the population of interest.

agency, or both. Social agencies have direct ties to relevant communities, and sometimes are used by other assistance programs as a point of intake. Similarly, government agencies that enroll households in various forms of assistance programs have experience with the application process, including the documentation needed. Governmental agencies and larger social agencies will tend to have sophisticated systems for keeping track of a household's status.

Some utilities, like Pacific Gas & Electric (PG&E), offer their programs on their webpages, and allow customers to apply on-line. In this way, they not only provide a convenient portal for enrollment in a discounted rate program, but they "brand" the affordability program as their own. In addition, they both control information about the program and put the authenticity of the utility behind the program. However, lack of internet access and other barriers to completing on-line forms can limit participation and make program application difficult for some customers.

For these reasons, PG&E contracts with community-based organizations to assist in outreach to customers who may not hear of the offering in the utility's direct mail, on-line, and through mass-media. There is likely a high correlation between populations that are out of the mainstream of information and referral, and populations who are at risk of being unable to afford utility services. There are also some populations of people who do not "trust" utilities (or government agencies), but who will listen to a local member explain the options and assist with an application. Further, such organizations can make internet access available to assist in the on-line application process. For example, the Creek Indians of Oklahoma run 20 community centers throughout their territory. They make computer access available through these centers, and help members make application for a variety of programs.

Questions frequently arise about how to protect the privacy of utility customers and of customers receiving some form of assistance based on their income. Customers can be asked at the time of application for the assistance if they would permit the agency to conduct such a match. This can be done through a box on the application indicating the desire to enroll in the utility program.

In the United States, a common arrangement is the promotion of an affordability program together with LIHEAP, and any other emergency/hardship assistance and energy efficiency services that are available in the jurisdiction. Even if there is not a unitary application, LIHEAP agencies will often include a checkbox on the LIHEAP application for a customer to indicate the desire for the LIHEAP application to serve as an application for participation in the low-income utility affordability program. The LIHEAP application may also provide an opportunity for the consumer to expressly waive privacy rights, so that documentation of income and of participation in other means-tested programs can be obtained by the utility or by the program administrator.

### **Automatic and Self Enrollment**

Another intake feature intended to enable the widest number of eligible customers to participate is the automatic enrolment of customers who do participate in another means-tested program. Consolidated Edison of New York provides an example of this. Twice a year, Consolidated Edison shares the names and addresses of its non-participating residential customers with the New York City Department of Human Services, which administers most means-tested programs offered in the city. The Department of

Human Services matches the names with its lists of participants of the allowed categorical eligibility programs and identifies those customers who appear on both lists. At this point, the Department of Human Services sends a letter to the customers advising them of their eligibility to participate in the utility's long-run affordability program. In New York, the letter provides an opportunity to opt out; if the customer does not object within 30 days, the utility automatically enrolls the household in the utility affordability program.

Automatic enrollment allows a utility to provide its long-term low-income assistance to a wide number of presumably-needy customers, at a very small administrative cost. The matching and letter-issuing process in New York costs between \$50,000 and \$100,000 (USD), and reaches several hundred thousand New Yorkers.

A few programs, such as the California CARES discount, allow self-certification. Some allow conditional approval based on self-certification with a requirement for later documentation. Here again, if a customer participates in another means-tested program that is accepted as proving categorical eligibility, the certification process is made considerably easier.

### **Recertification Processes**

The question of documentation requires program designers to make a trade-off between the perception of reduced fraud on behalf of customers and the encouragement of eligible households to participate. While there is little evidence of customers filing fraudulent applications, the general public may be reassured if the documentation requirements are high. But by the same token, many otherwise eligible households will be barred from participation because they cannot provide all the information and documentation required.

The desire to reassure the public that customers do not receive aid without meeting the eligibility requirements has led some programs to require annual recertification. Many evaluations of utility affordability programs, however, have shown that large numbers of eligible customers are dropped from the program at recertification time. Customers are not aware of the need to recertify or may have difficulty re-amassing the required documentation, which discourages application for continued participation.

In light of these facts, programs are moving to an 18 month cycle, or longer, rather than a 12 month recertification obligation. In addition, to the extent the customers are recipients of means-tested programs in which they are likely to continue to participate, the recertification obligation can be eliminated. This provision would apply, for example, to those receiving benefits from other programs open only to those whose need is unlikely to be reduced, such as the aged customer or one who is permanently blind or disabled. This allowance may be extended to other customers, to the extent it does not raise undue questions regarding fiscal integrity.

### 3.6. Delivery Mechanics/Administrator

Long-term low-income affordability programs have a number of administrative requirements. These include without limitation: determining the need for assistance in the utilities' service areas, outreach and marketing the program, taking applications, identifying the eligible customers, verifying their eligibility, determining the amount of assistance they will receive under the program, managing the flow of funds used for bill assistance, paying assistance grants to utilities on behalf of customers,<sup>19</sup> reporting on and evaluating program success, and proposing budgets. Often these administrative functions are parceled out to a number of governmental and private entities, but there is necessarily a role for the utility.

At the very least, the utility must adjust the customers' bills to reflect the amount of reduction afforded by the program. The type of benefit makes it easier or harder for a utility to reflect these program benefits in the bill. The once a year lump sum added to an energy-assistance benefit such as LIHEAP is the least burdensome process for a utility. Further, a uniform benefit for all households would be the least burdensome determinant of a benefit level. And the utility can piggy-back directly on LIHEAP-type government programs to deliver a ratepayer-funded affordability benefit.

As discussed above, however, the annual lump sum approach has the drawback that it does not address the customer's month-to-month need to pay the utility bill. Low-income households by definition do not have enough to meet basic necessities. They typically have difficulty saving money received in a lump sum and spreading it over the course of the year. The lump sum approach does not obviate the need to negotiate a manageable and affordable payment plan, such as one based on the burden left on the household. To this extent, using a lump sum approach excludes some of the tools that are best able to allow customers to pay their reduced bills on time and in full. It eliminates the portions of an affordability program that create a new, more positive ongoing relationship with the utility. An arrearage management program and budget billing are necessary tools to be used along with a lump sum benefit approach.

### 3.7. Program Funding

As noted above, program budgets are primarily defined as the extent to which the utility reduces its billings to program participants. This bill reduction is by far the largest "cost" of any affordability program. Program budgets typically do not reflect any estimated offsets, such as reduced credit and collection costs.

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<sup>19</sup> Affordability programs do not typically provide cash to participating customers, but rather arrange for the benefit to be used to reduce the participant's energy bill. If provided by the utility with ratepayer funds, it is accomplished by the utility rendering a lower bill. If provided as a grant from other sources, it is paid to the utility on behalf of the customer.

There are two fundamental issues policy makers must decide when considering program funding. The first is whether to allow the budget to vary depending on enrollment (at least in any given period), or to make design decisions against a fixed budget constraint.<sup>20</sup>

The second issue is to determine what form of rates will be used by the utility to recover its out of pocket costs for the program. For these purposes, we assume that the bulk of funding will come from other ratepayers. Within this issue are the questions of the rate classes that will be asked to contribute to the program cost, and the design of the rates (usage-based, per-customer, or other).

### **Fixed versus Flexible Budget**

The fixed versus flexible budget decision has certain consequences. If policy makers wish to assure other ratepayers that their contribution will be limited and defined, then a fixed budget is preferable. The New Jersey legislature specifies a dollar amount to be recovered from ratepayers, as well as the amount to be recovered from residential and non-residential customers. The Nevada statute accomplishes a similar result by specifying the surcharge rate to be applied to customers' bills. Where funding levels are set by the statute, it is more difficult to adjust the funding levels.

The corollary of a fixed budget is the need to restrain participation or benefit levels to stay within the budget. Some otherwise eligible low-income customers are bound to be unable to participate in this case, or will have their discount reduced with corresponding impacts on bill affordability. It will be necessary for program administrators to be vigilant about enrollment levels if the goal is to avoid reducing benefits per participant. If stakeholders also wish to target specific groups (e.g., the lowest income, those with the highest burdens, those with seniors in the household, etc.), then both funding projections and efforts to attract those groups must be closely watched.

If policy makers are prepared to allow the budget to vary with the levels of participation (including distribution among tranches of poverty or other determinants of actual benefit levels), it will be easier to manage funding levels. There will be no need to restrict enrollment to first come-first served, or to manage outreach intensively. Maryland,<sup>21</sup> California, and Massachusetts are among the states that cover the gross lost revenue in this way. The corollary is that the sum of bill reductions in any given year will vary by participation levels, as will needed support from other customers to address the program's unbilled revenues.<sup>22</sup>

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<sup>20</sup> For example, benefits from the Maine Energy Assistance Program discounts are subject to availability of funds (PSNH 2014). Nevada limits the surcharge for funding the program, which has the effect of limiting program funding (NRS Chapter 702, §160(1)).

<sup>21</sup> Maryland's universal service funds and programs are supervised by the Office of Home Energy Programs. The Maryland commission reviews the application of funds, determines benefit levels, and makes a report to the legislature. In recent years, Maryland has faced the problem that expenditures have not kept pace with funding, most likely indicating insufficient program outreach, intake and recertification.

<sup>22</sup> The United Kingdom and Australian benefits are typically funded with tax dollars (out of general revenues) and thus are funded by taxpayers in proportion to their obligations.

Note, however, that even where an affordability program has no maximum participation level and associated budget, prudent management is still need to oversee expenditures. Pennsylvania does this by requiring utilities to file a needs assessment every three years, and a plan for meeting the identified needs. The plan can be reopened during its term, if circumstances require. But if the budget is over- or underspent, program managers and regulators can adjust any of the program factors to bring the expected funding more in line with program costs. California similarly requires a triennial needs assessment.

One way to simplify the management of budget levels is to provide a fixed benefit to all participants, leaving only participant level to be estimated. Such programs should be based on a needs assessment, and it should be possible to estimate the number of participants, at least after a period of years. Further, if the data is available on the distribution of income and other eligibility determinants among the low-income population, it is possible to provide a tiered credit while still managing the budget closely. The budget may be open-ended at any given time but can be adjusted if needs be.

### **Designing Rates to Collect Program Funding**

As for collecting the necessary funds, the costs of utility administration could be melded into base rates, or can be recovered by some form of rider with particular rate designs. If the utility is to recover the costs in base rates, the costs (and any associated operational savings) will be reviewed in its base rate case proceedings. However, most utility programs are funded with a dedicated fee collected through a rider on utility rates. These riders are typically subject to an annual true-up, which enables the utility to collect an amount that matches precisely its actual loss in revenue over time.<sup>23</sup>

Historically the level of fees to cover unbilled revenues from universal service programs has been modest (less than a half-dollar per month per customer). With increasing pressure on rate levels in recent years, more attention has been paid to the size of universal service funding. Also, some jurisdictions in the United States have “raided” universal service funds (e.g., Texas, Connecticut) and diverted them to other general budget purposes. A dedicated fee allows it to be isolated from utility’s total costs, and exposes the fund to demands for “re-purposing.”

In most jurisdictions with programs funded by ratepayers, the costs are allocated to all classes, including commercial and industrial classes. Ohio has a hybrid approach: costs are recovered from all customers in a surcharge that is updated annually, except in the case of customers with usage over 700 MWh per month (very large industrial customers). For these customers, the surcharge for usage over 700 MWh is fixed at the lower rate that was in effect before changes were made to the program in 1999.

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<sup>23</sup> Just as budgets are typically based on the reductions in billings, it is unusual for a regulator to attempt to capture the offsetting considerations when setting the fees to fund the program. In part this is because it is difficult to do so, given data limitations. As for credit and collection costs, they are typically reflected in base rates without isolation and review.

## Funding For Administration

In some cases, program designs build in a limit on expenditures for program administration. The LIHEAP program limits grantees administrative costs to ten percent of funding. In Maryland, statute limits the administrative funding for the state agency that administers the program to 12 percent. Interestingly, this is the same state agency that administers the LIHEAP program; by federal law, the agency can only use ten percent of LIHEAP funds for administration.

In Nevada, the statute's terms are quite prescriptive. The Nevada statute limits administration costs of the regulator to three percent of program funds, and of the state LIHEAP agency to five percent of the 75 percent of total funds assigned (NRS Chapter 702, §170(4), 260(1)). The LIHEAP agency is thus limited to 3.75 percent of total funds ( $5\% * 75\% = 3.75\%$ ). Therefore, the total administrative draw on the fund is limited to 6.75 percent of total funds ( $3\% + 3.75\% = 6.75\%$ ). The addition of utility affordability funds to the already-administered LIHEAP-type benefit can reduce utility administrative costs.

Administrative costs for energy efficiency programs have been challenged on some occasions. Administrative costs for low-income bill affordability programs have not drawn great notice. One reason may be that it is difficult to assign costs to administration as opposed to other functions, making determination of over- or under-spending difficult.

## 4. POLICY OPTIONS AND CONSIDERATIONS

Our review has identified a number of areas where there is tension between tools to achieve program objectives. They generally lie along the line between simple and poorly targeted, and costly but well-targeted. Of course, there are myriad sets of decisions to be made. The policy makers can construct a program with a mix of techniques in an effort to achieve the desired balance between maximizing affordability and minimizing gross revenue losses and administrative expenditures.

Table C in Appendix C shows a number of long-term affordability programs, and the set of tools selected by the program designers. As can be seen, the range of options is wide. Even within burden-based programs, for example, there are several ways to determine and apply the bill assistance.

A program that usefully balances competing program goals for Ontario might contain the following features:

- a) Eligibility based on participation in another means-tested low-income program as well as by proof of low-income and utility burden;
- b) Outreach and intake by the utility on its webpages, and by contract with agencies that have offices in the communities staffed for similar functions.
- c) Benefit in the form of a monthly fixed credit.

- d) Amount of benefit pegged to average utility burden for the median income household in the community.
- e) Equal monthly billing for participants.
- f) Consideration of arrearage-forgiveness component.
- g) No recertification required where eligibility is likely to persist; two to four year recertification in cases where circumstances are subject to change; outreach to customers regarding recertification to improve compliance.
- h) Evaluation of program success in (1) reducing disconnections, (2) improving payment patterns, and (3) reaching intended beneficiaries.
- i) Periodic review of program to consider expansion of eligibility, feasibility of improving affordability and targeting features of program, and opportunities to streamline administration without undermining program effectiveness.

These features represent an effort to achieve widespread eligibility at reasonable costs, with little administrative complexity, and with maximum likelihood of improving affordability and payment patterns. Piggy-backing on existing means-testing, especially where intake offices are widely dispersed in the Province, will keep administrative costs low while reaching a large portion of those facing affordability problems. Using a fixed dollar credit, and tying it to the burden borne by the customer of median household income, simplifies determination and application of the credit. Providing an equal payment plan allows a low-income customer to manage limited resources through the year and improve payment patterns.

Each of the above features is discussed in more detail below.

- a) **Eligibility based on participation in another means-tested low-income program as well as by proof of low-income and utility burden.**  
It greatly reduces administrative costs if a bill assistance program piggy-backs on the evaluation of income and eligibility being done already for other means-tested programs. Exclusive reliance on this method will likely exclude many households whose needs are just as great as those of households who are “categorically eligible.” The categorical eligibility needs to be supplemented by a program-specific means test for those households who would not otherwise qualify and receive assistance.
- b) **Outreach and intake by the utility on its webpages, and by contract with agencies that have offices in the communities staffed for similar functions.**  
It is valuable for the utility to “own” the program. Such an approach allows the utility to brand the program through its existing advertising channels, make the program’s existence known to its customers periodically, and perform intake (at least to the point of making specific referrals to community-based organizations doing intake on a contract basis, or government agencies that qualify categorically-eligible customers).
- c) **Benefit in the form of a monthly fixed credit.**  
While there is almost no evidence that a bill varying by usage induces higher usage, it is useful to avoid that issue by providing the benefit as a fixed credit. This places the entire

burden of higher bills resulting from higher usage on the household. There should be exceptions allowed if the household's circumstances change such that its usage is impacted by the change.

d) **Amount of benefit pegged to average utility burden for the median income household in the community.**

There are no universal definitions of the affordable energy burden. Most programs are about six percent of income, with ranges from three to ten percent or more of income in the case of electrically heated homes. Pegging the burden to that of the median income household has an inherent "fairness" appeal.

e) **Equal monthly billing for participants.**

In addition to a fixed credit, customers should be provided budget billing. Some budget billing programs true-up a customer's annual bill, up or down, at the end of a year. Having a predictable and fixed bill to pay greatly enables planning and improves bill payment behavior.

f) **Consideration of arrearage-forgiveness component.**

Arrearage forgiveness programs have been highly effective in motivating positive bill payment behavior, and lowering disconnections for low-income customers.

g) **No recertification required where eligibility is likely to persist; two to four year recertification in cases where circumstances are subject to change; outreach to customers regarding recertification to improve compliance.**

The desire to avoid fraudulent benefit claims by the customer has led to cumbersome recertification requirements, which tend to push customers out of the program at the time of recertification. No fraud has ever been established in these programs. In the case of customers whose income is not likely to increase significantly year over year (such as pensioners and the disabled, or families with very young children dependent on income support), certification should only be done after two or four years from entry into the program.

h) **Evaluation of program success in (1) reducing disconnections, (2) improving payment patterns, and (3) reaching intended beneficiaries.**

These are the kinds of improvements that a utility should expect to enjoy with a successful bill assistance program. Evaluations could also be more detailed or target other indicators of success.

i) **Periodic review of program to consider expansion of eligibility, feasibility of improving affordability and targeting features of program, and opportunities to streamline administration without undermining program effectiveness.**

Any program should be revisited periodically to see if it is achieving its goals, and doing so in the most cost-effective manner.

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# APPENDIX A: RESEARCH DETAIL BY JURISDICTION

## Introduction

Appendix A provides the detailed results of the research conducted for a number of jurisdictions. It provides the complete information for each state to support the policy analysis and considerations contained within this report.



**Australia, Federal**

	Program Type	Rate Assistance	Emergency Assistance	Other (1)	Other (2)
<b>Overview</b>	Program Name	Energy concessions	Hardship assistance	Australia Utility Allowance	Household Assistance Package
	Reason/Mechanism for Establishing Program	Currently, energy concessions and hardship payments for vulnerable customers are provided by State and Territory Governments under the Australian Energy Market Agreement (2006), which opened retail electricity to competition.	Energy concessions and hardship payments for vulnerable customers are provided by State and Territory Governments under the Australian Energy Market Agreement (2006), which opened retail electricity to competition.	Supplement basic assistance grants to those receiving disability support pension, partner allowance or widow allowance.	Government created a \$15(AU) billion package when carbon tax enacted, to cushion price increase impacts. With the repeal of the carbon tax effective July 1, 2014, the Australian government revised the Clean Energy Supplement, which had been paid automatically to pensioners, families who receive family assistance, and others on government income support. The Clean Energy Supplement was a "sweetener" added to household assistance when the carbon tax was enacted. Originally proposed to be eliminated when the carbon tax was repealed, it was retained, and renamed the "Energy Supplement." In addition, the rate of payment as of 30 June 2014 was fixed for future payments, rather than increasing in future as had been the case with the Clean Energy Supplement.
<b>Design &amp; Admin.</b>	Utility and/or Program Administrator	In Australia, energy concessions (payments targeted at vulnerable customers to assist them to pay their energy bills) are predominately provided by state and territory governments and administered by energy retailers as an automatic deduction from energy bills.	The Australian Capitol Territory (ACT), Tasmania and the Northern Territory Governments do not offer direct emergency hardship payments, although retailers in these states do operate hardship programs which involve bill smoothing and payment plans. The ACT has a hardship program operated by the ACT Civil and Administrative Tribunal, and provides an external avenue through which customers experiencing hardship may apply to be put onto a retailer's payment plan or into a hardship program. The Tribunal has the power to direct a retailer to discharge part or all of an outstanding energy bill, including any interest or fees incurred, in exceptional hardship circumstances.	In addition to state concessions, the Australian Government provides an energy concession – known as a Utilities Allowance – for those receiving the disability support pension, partner allowance or widow allowance.	Usually automatic.
	Intake Process	Apply at Department of Work and Assistance.	Not available at this time.	Usually automatic.	Not available at this time.
	Program Design	Energy concessions (payments targeted at vulnerable customers to assist them to pay their energy bills) are predominately provided by state and territory governments and administered by energy retailers as an automatic deduction from energy bills.	In contrast to regular energy concessions, hardship assistance payments (emergency payments to customers already in financial stress) are provided on a temporary basis.	Flat monthly grant.	Flat monthly grant.
	Delivery Mechanics	Not available at this time.	Administration of hardship payments varies by jurisdiction. Hardship assistance is either directly provided by state governments or distributed in partnership with electricity retailers and charitable organizations such as St Vincent de Paul and the Salvation Army. The ACT has a hardship program operated by the ACT Civil and Administrative Tribunal.	Not available at this time.	
	Eligibility Requirements	Not available at this time.	In some states, payment eligibility is assessed by community welfare organizations on the basis of circumstances rather than automatic eligibility as a result of holding a Commonwealth concession card.	Not available at this time.	Given to pensioners, families who receive assistance and those on income support.
<b>Funding</b>	Funding Source	Not available at this time.	Not available at this time.	Not available at this time.	Federal budget.
	How Funding Levels are Established	Not available at this time.	Hardship payments are more variable in nature among the states than regular concessions, with amounts paid on a case-by-case basis, as assessed by the relevant department.	Not available at this time.	Not available at this time.
	Funding Dedicated to Program Admin.	Not available at this time.	Not available at this time.	Not available at this time.	Not available at this time.
	Entity Receiving Admin. Funding and Why	Not available at this time.	Not available at this time.	Not available at this time.	Not available at this time.
<b>Other</b>	Program Results/ Impacts	Analysis by consulting firm hired by Energy Supply Association of Australia concludes that four potentially vulnerable customer groups are at risk of "falling through the cracks": Family Formation Group (e.g. young families with small children), single renters with low income, regional (non-urban) customers with low income not connected to the energy network (mostly delivered gas customers but also some master-metered electricity customers), and new home buyers with low after-housing-cost income).	Analysis by consulting firm hired by Energy Supply Association of Australia concludes that four potentially vulnerable customer groups are at risk of "falling through the cracks": Family Formation Group, single renters with low income, regional (non-urban) customers with low income not connected to the energy network (mostly delivered gas customers but also some master-metered electricity customers), and new home buyers with low after-housing-cost income).	Not available at this time.	With the repeal of the carbon tax effective July 1, 2014, the Australian government revised the Clean Energy Supplement, which had been paid automatically to pensioners, families who receive family assistance, and others on government income support. The Clean Energy Supplement was a "sweetener" added to household assistance when the carbon tax was enacted. Originally proposed to be eliminated when the carbon tax was repealed, it was retained, and renamed the "Energy Supplement." In addition, the rate of payment as of 30 June 2014 was fixed for future payments, rather than increasing in future as had been the case with the Clean Energy Supplement. (Conversation 2014).
	Other	Not available at this time.	Not available at this time.	Not available at this time.	Australian Government has proposed welfare changes to make it harder to receive aide if able to work.



## Australia, Victoria

	Program Type	Rate Assistance	Off-peak concession	Other State-specific (1)	Other State-specific (2)
<b>Overview</b>	Program Name	Annual Electricity Concession	Off-peak concession	Service-to-property-charge concession	Electricity Transfer Fee Waiver
	Reason/Mechanism for Establishing Program	The Victorian Hardship Enquiry's Main Report established the following core principles or reasons for supporting vulnerable energy customers: that energy should be provided on 'fair and reasonable' terms, that a legitimate inability to pay should not result in disconnection, and that there is a balance to be struck between consumer welfare and the commercial realities that energy companies face.	Introduced in response to large increases in off-peak prices in the early 2000s.	To assist vulnerable customers with rising energy bills by removing monthly charge for line extension.	To assist vulnerable customers wishing to shop for competitive supplier.
<b>Design &amp; Admin.</b>	Utility and/or Program Administrator	Department of Human Services	Department of Human Services	Department of Human Services	Department of Human Services
	Intake Process	Customers call their electricity retailer and give their concession card details over the phone. The electricity retailer checks the customer's concession card details with Centrelink, and applies the discount to the customer's bill. Centrelink is a service offered by the Australian Government's Department of Human Services, and delivers payments and services for retirees, job seekers, families, parents, people with disabilities, Indigenous Australians, and people from culturally and linguistically diverse backgrounds, and provides services at times of major change. Many of Australia's assistance programs are connected to concession cards, which are identification cards related to health care, seniors, students, veterans, low-income, and other types of situations that cause customers to be on low or fixed incomes.	Not available at this time.	Not available at this time.	Not available at this time.
	Program Design	17.5% discount on electricity bills	13% discount on the off-peak tariff of electricity bills for households with separately metered electric hot water or slab heating. Not available in relation to the flexible or time-of-use tariffs enabled by a smart electricity meter or similar technology.	Provides a reduction on the (fixed cents/day) supply charge for concession households with low electricity consumption. The concession is applied if the cost of electricity used is less than the supply (or service) charge. The service charge is then reduced to the same price as the electricity usage cost.	Provides a full waiver of the fee that is normally payable to electricity retailers when there is a change of occupancy at a property.
	Delivery Mechanics	Utility applies discount/government pays for discounts.	Utility applies discount/government pays for discounts.	Utility applies discount/government pays for discounts.	Utility applies discount/government pays for discounts.
	Eligibility Requirements	Commonwealth Concession card. Many of Australia's assistance programs are connected to concession cards, which are identification cards related to health care, seniors, students, veterans, low-income, and other types of situations that cause customers to be on low or fixed incomes.	Commonwealth concession card.	Commonwealth concession card.	Commonwealth concession card.
<b>Funding</b>	Funding Source	Government	Government	Government	Government
	How Funding Levels are Established	Budget Process	Budget Process	Budget Process	Budget Process
	Funding Dedicated to Program Admin.	Not available at this time.	Not available at this time.	Not available at this time.	Not available at this time.
<b>Other</b>	Entity Receiving Admin. Funding and Why	Not available at this time.	Not available at this time.	Not available at this time.	Not available at this time.
	Program Results/Impacts	Not available at this time.	Not available at this time.	Not available at this time.	Not available at this time.
	Other	Not available at this time.	Not available at this time.	Operates like the waiver of a customer charge. Greater percent discount thus to lower use customers.	Not available at this time.

## California

	Program Type	Rate Assistance	Rate Design (1)	Rate Design (2)
<b>Overview</b>	Program Name	California Alternate Rates for Energy (CARE)	Medical Baseline	Family Energy Rate Assistance program
	Reason/Mechanism for Establishing Program	Commission authorized; statutory requirement and limits; Cal. Pub. Util. Code §382.	To assist customers with medical needs for electricity.	To help large families with utility bills.
<b>Design &amp; Admin.</b>	Utility and/or Program Administrator	Pacific Gas & Electric/Utilities	Pacific Gas & Electric/Utilities	Pacific Gas & Electric/Utilities
	Intake Process	Application forms can be obtained from the utility, or completed online through the utilities' website. Application forms also are available through numerous community agencies. For PG&E's CARE program, no proof of income is necessary for enrollment. Once a customer's application is approved, they see the CARE/FERA Program and monthly savings listed on the first page of their bill. The CARE discount appears on the bill after the completion of a full billing cycle. Customers receive the discount for two years (or four years if they are on a fixed income). Three months before the discount expires, PG&E sends a letter and re-certification application giving customers the opportunity to reapply if they still qualify under the current program guidelines.	Customers may call utility or apply on line.	Customers may call utility or apply on line.
	Program Design	30-35% discount off electric bill, depending on utility.	All residential customers are billed a certain amount of their natural gas and electricity use at their utility company's lowest residential rate. This is called the "Baseline Allowance" and it is set depending on what climate zone the home is in and whether it is the utility's "winter" or "summer" season. Extra allowances of natural gas and electricity are billed at the lowest rate for customers who rely on life support equipment, or those who have life threatening illnesses or compromised immune systems. The extra allowances are called Medical Baseline.	Families whose household income slightly exceeds the low-income energy program allowances will qualify to receive FERA discounts, which bills some of their electricity usage at a lower rate. FERA is available for customers of Southern California Edison, San Diego Gas and Electric Company, and Pacific Gas and Electric Company.
	Delivery Mechanics	Utility renders discounted bill.	Utility renders discounted bill.	Utility renders discounted bill.
	Eligibility Requirements	Customers with incomes under 200% of the Federal Poverty Levels are eligible for CARE. Customers may also qualify if they are enrolled in public assistance programs such as Medicaid/Medi-Cal, Women, Infants and Children Program (WIC), Healthy Families A & B, National School Lunch's Free Lunch Program (NSL), Food Stamps/SNAP, Low Income Home Energy Assistance Program (LIHEAP), Head Start Income Eligible (Tribal Only), Supplemental Security Income (SSI), Bureau of Indian Affairs General Assistance, and Temporary Assistance for Needy Families (TANF) or Tribal TANF. CARE is also available to the following PG&E customers: Tenants of Sub-Metered Residential Facilities Qualified Non-Profit Group Living Facilities Agricultural Employee Housing Facilities Migrant Farm Worker Housing Facilities.	Customers with household member needing life-support equipment. "Life support equipment" means equipment that uses mechanical or artificial means to sustain, restore, or supplant a vital function, or mechanical equipment that is relied upon for mobility both within and outside of buildings. This includes: All types of respirators, iron lungs, hemodialysis machines, suction machines, electric nerve stimulators, pressure pads and pumps, aerosol tents, electrostatic and ultrasonic nebulizers, compressors, IPBB machines and motorized wheelchairs. Also, in consideration of their increased heating and cooling needs, the Medical Baseline allowance is available to paraplegics and quadriplegics, multiple sclerosis patients, scleroderma patients, and people being treated for a life threatening illness or who have a compromised immune system.	Families whose household income slightly exceeds the low-income energy program allowances will qualify to receive FERA discounts, which bills some of their electricity usage at a lower rate. FERA is available for customers of Southern California Edison.
<b>Funding</b>	Funding Source	All ratepayers via nonbypassable volumetric charge on distribution services.	Residential cost responsibility is redistributed in rate design process.	All ratepayers - nonbypassable volumetric distribution charge.
	How Funding Levels are Established	Low Income needs assessment as required by Cal. Pub. Util. Code §382(d); participation of customers and effect of applicable discounts.	Function of participation and associated rates.	Function of participation and associated rates.
	Funding Dedicated to Program Admin. Entity Receiving Admin. Funding and Why	Not available at this time.	Not available at this time.	Not available at this time.
<b>Other</b>	Program Results/ Impacts	Not available at this time.	Not available at this time.	Not available at this time.
	Other	Not available at this time.	Inverted block rates under consideration by Commission - Assigned Commissioner has proposed moving to TOU rates, which would make baseline rates inapplicable. Consumer groups are fighting the proposed change. Recent statute continues bar on requiring residential TOU rates before 2018.	Not available at this time.



## Colorado

	Program Type	Rate Assistance - PIPP	State Energy Assistance
<b>Overview</b>	Program Name	Percentage of Income Payment Plans (PEAP)	Low Income Energy Assistance Program (LEAP)
	Reason/Mechanism for Establishing Program	Established in 2012. Mandated by the CPUC which oversees the utilities and regulates the terms.	To help address declining federal LIHEAP funding.
<b>Design &amp; Admin.</b>	Utility and/or Program Administrator	Xcel Energy (4 other utilities also provide this program)	Colorado Department of Human Services (CDHS)
	Intake Process	The State LEAP office provides utilities with data on LEAP approved households, which is used for direct outreach to these clients. Xcel Energy created a portal to assist counties with eligibility determination by transmitting daily data on customer heating costs to the state's centralized LIHEAP eligibility processing system.	CDHS sends out a mass mailing of applications prior to the start of the season to all previous year clients. New clients hear about the program through 1) mass media (tv and radio advertising, community columns, call-in with major news stations), 2) county local outreach with community agencies (flyers, brochures, events), 3) state website (w/ access to the application), 4) Program Eligibility Application Kit (PEAK) (website where clients can determine if they are eligible for LEAP) and 5) statewide heat help line where clients can call and get information.
	Program Design	Monthly reductions in low-income customers' bills, both current and those in arrears. Also educates customers on ways to manage their monthly bill. Participants pay between 2 and 3 percent of their household income, and have the opportunity to have past-due amounts forgiven. Requires participants to be billed 3 percent of their electric bills and 3 percent of their gas bills, bringing their maximum total payment to six percent of income. Arrearage forgiveness plan forgives existing arrears over a 24-month period.	Pays a portion of a customers bill directly to their utility company.
	Delivery Mechanics	Utilities manage the program.	CDHS manages the program.
	Eligibility Requirements	LEAP approved households.	150% FPG. Eligibility is based on household income and federal poverty guidelines. Those approved for this program may also receive Emergency Assistance.
<b>Funding</b>	Funding Source	Customer surcharges.	LIHEAP funding from the state as well as private funds from oil and gas companies, foundations, and private donations.
	How Funding Levels are Established	Not available at this time.	Not available at this time.
	Funding Dedicated to Program Admin.	Not available at this time.	Not available at this time.
	Entity Receiving Admin. Funding and Why	Each of the five largest utility companies maintains departments dedicated to working with their low-income clients to ensure those households get the heating they need and can manage their bill payments.	Not available at this time.
<b>Other</b>	Program Results/ Impacts	8,500 households assisted.	90,000 households served in the 2013-2014 program year with an average benefit of \$438.
	Other	Not available at this time.	Commission on Low Income Energy Assistance coordinates state-funded efforts. The state and EOC maintain an 800 number, run by a contractor, to provide centralized information and referrals to those seeking help with energy costs.

## Illinois

	Program Type	Rate Assistance
<b>Overview</b>	Program Name	Percentage of Income Payment Plan (PIPP)
	Reason/Mechanism for Establishing Program	First required by the Low Income Home Energy Assistance Act of 1981, and amended by Illinois Energy Assistance Act of 1989. The Illinois Energy Assistance Act (IL EAA) details the requirements for low-income energy assistance programs in the state. The IL EAA requires four programs: (1) the energy assistance program, (2) a state weatherization program, (3) the percentage of income payment plan (PIPP or PIP), and (4) an arrearage reduction program as part of the PIPP. The Department of Commerce and Economic Opportunity (DCEO) (the state department that sponsors statewide economic development) has interpreted the IL EAA such that LIHEAP carries out the energy assistance program requirements of the IL EAA. (305 ILCS 20; IL LIHEAP 2014c).
<b>Design &amp; Admin.</b>	Utility and/or Program Administrator	Utilities serving more than 100,000 customers as of 1/1/2009 are required to offer the program, which includes Ameren Illinois, ComEd, Nicor Gas, and Peoples Gas/North Shore Gas.
	Intake Process	PIPP eligibility is determined by Local Administrative Agencies (LAAs). These are local community action agencies, other community-based organizations or units of local government that implement the LIHEAP at the local level. These agencies are responsible for the provision of outreach, referral, energy-related counseling and educational materials, taking applications, verifying eligibility information and issuing assistance payments to energy vendors. LAAs are required to notify applicants of their eligibility status within 30 days of the date the client application is complete. (DECO 2013, p 4). Applications for PIPPs are handled centrally by the state Department of Commerce and Economic Opportunity's Office of Energy Assistance and not through the individual vendors, but the participating utility companies have helped design the program from its beginning in 2011. The utilities offering PIPPs use a real-time integrated data system in which they enter and track customer information such as Social Security Number and termination status to aid in program administration. (ASPE 2014, p 30).
	Program Design	A bill payment assistance program for low-income customers. Participants pay no more than 6 percent of their income for gas and electric service. The maximum PIPP benefit is \$1,800 per year, with a maximum of \$100 per month for the participant's natural gas bill and \$50 for the electric bill. The PIPP program has an arrearage reduction component, which provides participants with a monthly benefit towards their utility bill and a reduction in overdue payments for every on-time payment they make by the bill due date. Participants who make their monthly PIPP payments on time receive a monthly credit amounting to one twelfth of their past due bills, up to \$1,000 total per year for both gas and electric bills. (305 ILCS 20/18, (c)(5); IL LIHEAP 2014c). The PIPP includes client education to inform customers about the PIPP and about their rights and responsibilities under the program. If clients miss their payments, the local agencies attempt to contact them and help them stay on the program. (IL LIHEAP 2014c).
	Delivery Mechanics	The DCEO remits, through the LAAs, to the utility or participating alternative supplier that portion of the plan participant's bill that is not the responsibility of the participant. Essentially, the DCEO collects program funding (as described below), determines the customer's program eligibility, and pays the funding to the utility on behalf of the customer.
	Eligibility Requirements	Up to 150 percent of federal poverty guidelines. The DCEO establishes the specific eligibility levels, and in so doing considers factors such as economic conditions, state and federal funding levels, and energy costs. PIPP eligibility is based on whether the customer is on retail competition, and whether their supply vendor collects the SLEAF charge. If the vendor does not collect the charge, then the customer cannot receive benefits from that funding source. PIPP participants have the option of signing up for PIPP or receiving a one-time direct vendor payment, either through LIHEAP funds or the ratepayer (meters charge) funds. If a customer participates in PIPP, it cannot participate in another energy assistance program for the year. (305 ILCS 20/18, (c)(2)).
<b>Funding</b>	Funding Source	There are two sources of funding for this program. The Supplemental Low-Income Energy Assistance Fund (SLEAF) is funded by voluntary donations from individuals, foundations, corporations, and other sources. The Energy Assistance Charge collects funds from all ratepayers to fund the assistance programs.
	How Funding Levels are Established	Funding levels are based on availability for each funding source. The SLEAF level of funding is based on the donations provided. The Energy Assistance Charge is as follows: residential customers are charged \$0.48 a month, small C&I customers are charged \$4.80 a month, and large C&I customers are charged \$360 a month.
	Funding Dedicated to Program Admin.	The amount of the SLEAF funds spent on administrative expenses in a year must not exceed 10 percent of the amount collected during that year. Illinois utilities were required to pay a one-time payment of \$22 million with the passage of the IL EAA. These funds were used for the DCEO's cost of program implementation. It is not clear if administrative requirements are associated with the Energy Assistance Charge.
	Entity Receiving Admin. Funding and Why	Funding is eventually transferred to the Department of Commerce and Economic Opportunity, but may be collected through utilities or through the State Treasury.
<b>Other</b>	Program Results/ Impacts	For FY 2012, the program enrolled over 37,000 households and spent \$21.6 million for PIPP benefits and another \$37.3 million for direct vendor payments to PIPP households. At the end of FY 2013, at least \$35 million had been obligated on behalf of about 52,000 participants. From 2011 to 2012, there was a 6% decrease in residential electric terminations.
	Other	Not available at this time.

## New York

	Program Type	Rate Assistance (1)	Rate Assistance (2)
<b>Overview</b>	Program Name	Low-Income Rate Assistance (in general)	ConEd's Low Income Program
	Reason/Mechanism for Establishing Program	Not available at this time.	Since 1989, the New York PSC has directed the creation and expansion of targeted low-income rate assistance program. The New York legislature has had little involvement.
<b>Design &amp; Admin.</b>	Utility and/or Program Administrator	Administered by the utilities.	Con Edison, with assistance from human services agency eligibility determination or categorically-eligible.
	Outreach and Intake	Varies by utility.	The Company pays the out-of-pocket costs for the city and county [NYC and Westchester] Departments of Human Services to run a computer match twice a year of categorically-eligible households and the utility's residential customers. The utility sends a list of residential customers to the agency, which then conducts the computer match. The agency notifies the utility of the matches, and sends a letter advising the customer that she will be enrolled in the low-income program unless she opts out. The utility must enroll the customer within 30 days of receiving the information that the customer is a match.
	Program Design	Discounts off the basic monthly service charge for electricity and/or gas. Monthly discounts range from \$2 to \$24 off the monthly fixed customer charge. Some gas companies provide discounts on consumption up to a specified level. For example, Con Edison provides a 50 percent discount on the first 90 therms to 165,000 customers. Some of these programs offer arrears forgiveness and case management as well. For example, KeySpan's "On-Track" program provides financial assistance, education, and energy and financial management to a limited number of low-income customers. Customers on the payment plan may receive credits on past due accounts.	Flat dollar reduction off monthly bill, plus waiver of reconnection fees.
	Delivery Mechanics	Varies by utility.	Company has billing software to compute effect of discount off participating customers' bills.
	Eligibility Requirements	For most programs, households in receipt of or eligible for LIHEAP are automatically enrolled into the program.	Customers enrolled in the Utility Guarantee or Direct Vendor programs administered by local human resource agencies; receive benefits under Temporary Assistance for Needy Persons/Families, Safety Net Assistance, Supplemental Security Income, or the Supplemental Nutrition Assistance Program; or received a Home Energy Assistance Program [LIHEAP] grant in the last twelve months. In last rate case, low-income advocates urged that Medicaid receipt be added to the list of programs receipt of which make a customer "categorically eligible." The PSC deferred its decision, pending research to estimate how many Medicaid eligible customers are served by Con Edison that are not already participants in the electric low-income program. On August 21, Con Edison provided those numbers, along with its analysis of how its low-income program budget could adapt to any anticipated changes in volume.
<b>Funding</b>	Funding Source	Funded through utility rates recovered from all customer classes.	Funded through utility rates recovered from all customer classes.
	How Funding Levels are Established	Rate cases and settlements.	In most recent rate case, 13-E-0030, order issued 2-14-14, all but low-income intervenors agreed to settlement that would set the budget at \$[US] 47.5 million, assuming a \$9.50 per month per participant bill reduction (up from \$8.50), and the program having on average, approximately 417,000 customers. Con Edison reported in August that adding Medicaid as qualifying means-tested program for categorical eligibility would add 129,000 more customers to program. Assuming same \$9.50 credit for all participants, the budget would have to increase by about \$15 million, to \$65.2 million for rate credits. The Commission has not ruled on the issue.
	Funding Dedicated to Program Admin.	Varies by utility.	See How Funding Levels are Established.
	Entity Receiving Admin. Funding and Why	Utilities plus any contract assistance (e.g. intake).	Con Ed staffing is part of O&M in base rates. Small payment for matching and opt-out letters is made to agencies.
<b>Other</b>	Program Results/ Impacts	As of mid-2013, the state's major electric and gas companies were providing about \$112 million annually for low-income rate assistance programs that assisted over one million households.	In most recent year, 417,000 customers were enrolled.
	Other	Not available at this time.	Not available at this time.



# Pennsylvania

Program Type	Discount, DSM, credit and collection rules	Emergency Assistance
<b>Overview</b>	<p><b>Program Name</b> Customer Assistance Programs (CAPs) Discount</p> <p><b>Reason/Mechanism for Establishing Program</b> Pennsylvania statute requires protections, policies, and services that assist low-income customers to maintain electric service known as Universal Services and Energy Conservation. This term also includes customer assistance programs, termination of service protection and policies and services that help low-income customers to reduce or manage energy consumption in a cost-effective manner, such as the low-income usage reduction programs, application of renewable resources and consumer education. (PA Title 66, Chapter 28, §52802.10), 2803). To fulfill the Universal Services and Energy Conservation requirements, the Pennsylvania Public Utility Commission (PA PUC) established standard reporting requirements for the utilities in the state (PA Title 52, Chapter 54, §§ 54.71-54.78). Historically, utilities offered various forms of assistance programs. As part of the transition to deregulated supply markets, universal service programs were defined as part of the statute and made mandatory for larger utilities, although utilities still offer various types of assistance programs.</p>	<p><b>Program Name</b> Customer Assistance and Referral Evaluation Services (CARES)</p> <p><b>Reason/Mechanism for Establishing Program</b> Pennsylvania statute requires protections, policies, and services that assist low-income customers to maintain electric service known as Universal Services and Energy Conservation. This term also includes customer assistance programs, termination of service protection and policies and services that help low-income customers to reduce or manage energy consumption in a cost-effective manner, such as the low-income usage reduction programs, application of renewable resources and consumer education. (PA Title 66, Chapter 28, §52802.10), 2803). To fulfill the Universal Services and Energy Conservation requirements, the Pennsylvania Public Utility Commission (PA PUC) established standard reporting requirements for the utilities in the state (PA Title 52, Chapter 54, §§ 54.71-54.78). Historically, utilities offered various forms of assistance programs. As part of the transition to deregulated supply markets, universal service programs were defined as part of the statute and made mandatory for larger utilities, although utilities still offer various types of assistance programs.</p>
<b>Design &amp; Admin.</b>	<p><b>Utility and/or Program Administrator</b> The programs are administered by the largest utilities in the state, which includes six electric utilities, seven gas utilities, and one combination electric and gas utility. Each of these utilities is required to submit a universal services plan every three years, which includes a projected needs assessment and projected enrollment level for its universal services programs for the upcoming three years (PA PUC 2012, p 34). The utilities' plans are then reviewed by the PA PUC.</p> <p><b>Intake Process</b> Utilities use a variety of methods to reach customers, and each utility uses a different approach. In general, local agencies and utility support staff communicate directly with eligible customers. They attempt to match customers' needs with existing utility and/or community programs. For example, PPL uses Customer Programs Directors (CPDs), who have responsibility for the day-to-day administration of the utilities universal service programs. PECO uses community partners that provide opportunities and access to resources that offer the assistance that low-income customers may need. Utilities identify potential enrollees through a variety of means such as, customer telephone inquiries; when a customer receives energy assistance grants; referrals from community groups, other utilities or state agencies; public outreach sessions, community workshops and advocate-sponsored events for low income customers. After the utility identifies potential enrollees, it asks these customers if they are interested in receiving information about Universal Services programs, and provides information and applications to those who are interested.</p> <p><b>Program Design</b> An alternative collection method that provides payment assistance. CAP participants agree to make regular monthly payments that are for an amount that is less than the current bill in exchange for continued provision of electric utility services. The individual programs do have some variances from the CAP Policy Statement. One area in particular that may vary is the amount of the maximum CAP credit. The CAP discount has an arrearage forgiveness component, which is provided generally over a two to three year period. The customer receives arrearage forgiveness for each on-time, in full CAP payment received. The structure and exact requirements of the arrearage forgiveness program is established on a case by case basis through plan filings.</p> <p><b>Delivery Mechanics</b> Payments are made directly to companies on behalf of eligible customers.</p> <p><b>Eligibility Requirements</b> At or below 150 percent of federal poverty guidelines; must have made a payment agreement with their utility. The CAP Policy Statement states that customers should apply for LIHEAP. The LIHEAP grant may be applied to either the electric or natural gas account. There is not a requirement that customers receive a LIHEAP grant in order to participate in CAP.</p>	<p><b>Utility and/or Program Administrator</b> Same as Discount, LIURP</p> <p><b>Intake Process</b> Utilities use a variety of methods to reach customers, and each utility uses a different approach. In general, local agencies and utility support staff communicate directly with eligible customers. They attempt to match customers' needs with existing utility and/or community programs. For example, PPL uses Customer Programs Directors (CPDs), who have responsibility for the day-to-day administration of the utilities universal service programs. PECO uses community partners that provide opportunities and access to resources that offer the assistance that low-income customers may need. Utilities identify potential enrollees through a variety of means such as, customer telephone inquiries; when a customer receives energy assistance grants; referrals from community groups, other utilities or state agencies; public outreach sessions, community workshops and advocate-sponsored events for low income customers. After the utility identifies potential enrollees, it asks these customers if they are interested in receiving information about Universal Services programs, and provides information and applications to those who are interested.</p> <p><b>Program Design</b> This program helps selected, payment-troubled customers maximize their ability to pay utility bills. Provides a casework approach to help customers secure energy assistance funds and other needed services. The structure and requirements of the CARES program varies from utility to utility. For example, the emphasis of NFG's CARES Program is towards those customers with short-term and temporary hardships. Qualifying households may receive counseling and/or direct referrals to community resources that can aid in resolving the emergency.</p> <p><b>Delivery Mechanics</b> As utilities have expanded their CAP programs, the focus of CARES has changed, and is now a component of CAP. CARES is a component of CAP for each of the utilities that are required to maintain a CAP program.</p> <p><b>Eligibility Requirements</b> Payment-troubled customers. CARES is about referring CAP customers to other available resources in the community. For example, PECO's CARES program directs its CARES resources to customers at or below 50% of the Federal Poverty Level (FPL). PECO's CARES resources are provided for customers who are low-income; have "special needs" which are defined as CAP customers below 50% of the Federal Poverty Level; and have extenuating circumstances. NFG's CARES Program, however, directs its resources to low income, fixed income, special needs, and payment troubled customers who are experiencing short-term financial hardships. The CAP Policy Statement states that customers should apply for LIHEAP. The LIHEAP grant may be applied to either the electric or natural gas account. There is not a requirement that customers receive a LIHEAP grant in order to participate in CARES. CARES provides information about resources available in the community, and LIHEAP may be one of those resources available.</p>
<b>Funding</b>	<p><b>Funding Source</b> Program costs are included in utility rates as part of the distribution cost passed on to all residential customers. The costs may be collected through distribution base rates and/or a universal service surcharge mechanism.</p> <p><b>How Funding Levels are Established</b> CAP Programs must be cost-effective, but there is no specific formula for establishing the budget level for the CAP programs. The budgets are determined on a case by case basis by the PA PUC. The utilities presents a proposed budget in its three-year Universal Service and Energy Conservation Plan. In that proceeding, the utilities will present a Needs Assessment based on the company's current CAP enrollment levels and the U.S. Census results in the service territory. In the filing, the utility will make a proposal about how much to ramp up the program each year, and the parties will evaluate the proposal and may make recommendations in the case. The size and costs of the programs varies depending upon the needs of the service territory and from utility to utility. Funding levels are sometimes negotiated as part of disposition of rate cases or other dockets, such as merger applications.</p> <p><b>Funding Dedicated to Program Admin. Entity Receiving Admin. Funding and Why</b> In 2011 and again in 2012, the utilities' weighted average spending on administration costs was 4% of overall costs. Utilities receive administrative funding as they are the ones that implement the programs.</p>	<p><b>Funding Source</b> CARES is funded as part of the universal service program surcharge. It is not funded by LIHEAP cash and crisis grants.</p> <p><b>How Funding Levels are Established</b> CAP Programs must be cost-effective, but there is no specific formula for establishing the budget level for the CAP programs. The budgets are determined on a case by case basis by the PA PUC. The utilities presents a proposed budget in its three-year Universal Service and Energy Conservation Plan. In that proceeding, the utilities will present a Needs Assessment based on the company's current CAP enrollment levels and the U.S. Census results in the service territory. In the filing, the utility will make a proposal about how much to ramp up the program each year, and the parties will evaluate the proposal and may make recommendations in the case. The size and costs of the programs varies depending upon the needs of the service territory and from utility to utility. Funding levels are sometimes negotiated as part of disposition of rate cases or other dockets, such as merger applications.</p> <p><b>Funding Dedicated to Program Admin. Entity Receiving Admin. Funding and Why</b> In 2011 and again in 2012, the utilities' weighted average spending on administration costs was 4% of overall costs. Utilities receive administrative funding as they are the ones that implement the programs.</p>
<b>Other</b>	<p><b>Program Results/ Impacts</b> Electric CAP spending for 2012 totaled \$234.4 million and gas CAP spending was \$105.3 million, with 309,570 customers enrolled in electric utility programs and 175,015 in gas utility programs. In 2011, electric CAPs spent \$250 million and enrolled 306,213 households, and gas CAPs spent \$151.7 million and enrolled 189,690. In 2012, 37% of electric arrearages (in dollars) were on an agreement plan.</p> <p><b>Other</b> From 2011 to 2012, there was a 6% decrease in residential electric terminations.</p>	<p><b>Program Results/ Impacts</b> Electric CAP spending for 2012 totaled \$234.4 million and gas CAP spending was \$105.3 million, with 309,570 customers enrolled in electric utility programs and 175,015 in gas utility programs. In 2011, electric CAPs spent \$250 million and enrolled 306,213 households, and gas CAPs spent \$151.7 million and enrolled 189,690. In 2012, 37% of electric arrearages (in dollars) were on an agreement plan.</p> <p><b>Other</b> From 2011 to 2012, there was a 6% decrease in residential electric terminations.</p>



**Pennsylvania, PPL**

	Program Type	Rate Assistance
	<b>Overview</b>	Program Name
Reason/Mechanism for Establishing Program		Competition Acts require Commission to ensure universal service and energy conservation services and to continue, at a minimum, the same level and nature of consumer protection policies and services that were in place at the time the Competition Acts became effective.
<b>Design &amp; Admin.</b>	Utility and/or Program Administrator	Commission's Universal Service and Energy Conservation Reporting Requirements require each large EDC to submit a universal service and energy conservation Plan every 3 years for approval.
	Intake Process	CSRs refer payment-troubled customers to the CBOs. DurMust have proof of income. PPL uses 10 CBOs [2 county government offices and 8 Community Action Agencies - nonprofits that administer LIHEAP] to administer OnTrack 65 caseworkers at 27 sites.
	Program Design	Primary features: Reduced payment arrangement based on ability to pay [flat monthly payment at program-determined level]. Arrearage forgiveness over 18 mos. Protection against shutoff of electric service. Referrals to other programs and services PL Electric establishes an 18-month debt forgiveness plan. 4 major purposes: 1. Improve customers' bill payment habits and attitudes; 2. Stabilize or reduce customers' energy usage; 3. Eliminate uncollectible balances for program participants; and 4. Provide the customer with other beneficial services and/or programs through a network CBOs.
	Delivery Mechanics	Presently 5 methods for determining affordable amount. All have effect of relating pmt requirement to customer's % of FPL. Small charge to defray part of back balances.
	Eligibility Requirements	Act does not define "affordability;" PAPUC Policy Statement provides guidance. PPL's CAP available to customers with incomes at or below 150% of the FPL, and who are "payment-troubled."
<b>Funding</b>	Funding Source	PAPUC must ensure that the utilities run the programs in a cost-effective manner. Utilities recover approved costs through universal service charge on all customers.
	How Funding Levels are Established	The Company has proposed CAP expenditure funding of approximately \$56.6 million in 2014, \$62.8 million in 2015, and \$65.4 million in 2016.
	Funding Dedicated to Program Admin.	Most recent 3-Year Plan recites intention to bring collection functions in house to save money.
	Entity Receiving Admin. Funding and Why	Utility through Universal Service Charge; CBOs through contracts with utility.
<b>Other</b>	Program Results/ Impacts	Not available at this time.
	Other	In 2012, for example, CSRs made nearly 120,000 referrals to OnTrack administering organizations prompted by information provided by customers apply in person.

## Seattle, Washington

	Program Type	Rate Assistance
<b>Overview</b>	Program Name	Seattle Utility Discount Program
	Reason/Mechanism for Establishing Program	City leaders consider Seattle electric rates high, and living costs high and rising, and want to make sure all in City can afford utilities.
	Utility and/or Program Administrator	Seattle City Light and City of Seattle Human Services Department per Memorandum of Agreement with Seattle City Light utility.
<b>Design &amp; Admin.</b>	Intake Process	Not available at this time.
	Program Design	60% discount off electricity bill [Note: Seattle Public Utilities offers companion 50% discount from water/sewer/trash removal bills].
	Delivery Mechanics	Rendered bill is regular rate discounted 60%.
	Eligibility Requirements	Seattle City Light customer, =/<70% of state minimum income, not living in subsidized housing.
	Funding Source	Cost allocation in rates; i.e. other ratepayers.
<b>Funding</b>	How Funding Levels are Established	Utility's rates are set every 2 years by mayor and city council.
	Funding Dedicated to Program Admin.	2014 budget - \$8.1 million [including \$87.85 per client for SPU admin].
	Entity Receiving Admin. Funding and Why	Seattle City Light has 9 FTEs; Human Services Department has 13.5 FTEs for electricity and water/sewer MOA work combined. SCL and SDP split MOA admin costs 56/44 based on relative size of customer base.
	Program Results/ Impacts	2014 expected average benefit: \$8.8 million/16,800 participants = \$524
<b>Other</b>	Other	In 2014, mayor and city utilities began a multi-year effort to raise participation.

## United Kingdom

	Program Type	Rate Assistance (1)	Rate Assistance (2)	Rate Assistance (3)
<b>Overview</b>	Program Name	Warm Home Discount scheme	Winter Fuel Payments	Cold Weather Payments
	Reason/Mechanism for Establishing Program	To address those who are income poor.	To address seniors who are likely to be income/fuel poor.	To address those who are fuel poor, not necessarily income poor.
<b>Design &amp; Admin.</b>	Utility and/or Program Administrator	Department of Energy and Climate Change (DECC)/Ofgem/Npower (not every supplier provides this discount to low income customers)	Department for Work and Pensions (DWP)	Department for Work and Pensions (DWP)
	Intake Process	Automatic, no application is necessary. If a customer meets the conditions set out in law, they will receive a payment or grant. If they are not happy with the decision, they, or someone else who has the authority to act on their behalf, can 1) ask for an explanation, 2) ask for a written statement of reasons for the decision, 3) ask for the agency to look again at the decision or 4) appeal against the decision to an independent tribunal (this must be in writing). Customers can do any or all of these actions.	Automatic, no application is necessary. If a customer meets the conditions set out in law, they will receive a payment or grant. If they are not happy with the decision, they, or someone else who has the authority to act on their behalf, can 1) ask for an explanation, 2) ask for a written statement of reasons for the decision, 3) ask for the agency to look again at the decision or 4) appeal against the decision to an independent tribunal (this must be in writing). Customers can do any or all of these actions.	Automatic, no application is necessary. If a customer meets the conditions set out in law, they will receive a payment or grant. If they are not happy with the decision, they, or someone else who has the authority to act on their behalf, can 1) ask for an explanation, 2) ask for a written statement of reasons for the decision, 3) ask for the agency to look again at the decision or 4) appeal against the decision to an independent tribunal (this must be in writing). Customers can do any or all of these actions. Customers who have recently had a child or are caring for a child younger than five may need to inform the agency that provides these funds.
	Program Design	An annual rebate of £140 provided to vulnerable customers in or at risk of fuel poverty.	Annual tax-free cash transfers of between £100-300 to seniors. The amount paid depends on where you live (i.e., care facility or at home), how many people you live with and the ages of those people. These living conditions are assessed during one qualifying week per year. There is no customer obligation to spend any of the payment on energy.	£25 to vulnerable customers for each seven day period of "very cold weather" between 1 November and 31 March. Vulnerable customers are defined as those on income support or those who receive pension credit and are disabled, have a child who is disabled, or are raising a child younger than five years old. Very cold weather is defined as when the local temperature is either recorded as, or forecast to be, an average of zero degrees Celsius or below over 7 consecutive days.
	Delivery Mechanics	DECC is currently coordinating aid to the Core Group of eligible, Ofgem the remaining three. The Scheme is divided into four groups, namely the Core Group, the Broader Group, Legacy Spend and Industry Initiatives. The Core group and Broader group are the two major components of the scheme.	Payments are made directly into the customer's nominated bank account, without restriction on how they are spent.	Monitored by the DWP. Benefits are paid automatically into the same customer account as the one in which they receive their benefit payments. Customers receive payments within 14 working days after each period of cold weather. Participation in this program does not preclude participation in any of the other programs.
	Eligibility Requirements	The Core Group is comprised of poorer pensioner households identified by the Department of Work and Pensions (DWP). The DWP shares information about recipients of Pension Credits with retailers. Eligible Core group members receive an automatic annual rebate on their energy bill. Customers must apply to be a member of the Broader Group and they must receive certain additional benefits to be eligible. Suppliers are also required to provide annual rebates to these customers, but suppliers set the eligibility criteria, in line with WHD regulations. As an example, Npower's customers are considered part of the Broader Group if they receive any of 1) Income support/Income based jobseeker's allowance/income related employment and support allowance; 2) and one of Child tax credit/disability premium/Disability Living Allowance/Long Term Incapacity Benefit.	Customers are eligible if they are recipients of State pensions or another social security benefit (excluding Housing Benefit, Council Tax Benefit and Child Benefit). Generally, they are eligible if they were born on or before July 5, 1951 (date changes every year) and normally live in the UK throughout the coldest week in September. The amount available depends on whether the customer meets certain additional criteria. For example, eligible customers aged 80 or over on a Pension Credit will receive £300, whereas an eligible customer living with someone who also qualifies will receive just £100.	Customers are generally eligible if they receive benefits including Pension Credit, Income Support, Jobseeker's Allowance (assuming they meet sub-criteria such as receiving a Child Tax Credit), and Employment and Support Allowance (assuming they meet sub-criteria such as receiving a severe or enhanced disability premium).
<b>Funding</b>	Funding Source	Energy suppliers	The Social Fund	The Social Fund
	How Funding Levels are Established	The Warm Home Discount Scheme that came into effect on April 1, 2011 provides £1.13b to fuel poor customers over the four years until 2015.	Mandated by law.	Mandated by law.
	Funding Dedicated to Program Admin.	Not available at this time.	Department for Work and Pensions (DWP), possibly others	Department for Work and Pensions (DWP), possibly others
	Entity Receiving Admin. Funding and Why	Not available at this time.	Not available at this time.	Not available at this time.
<b>Other</b>	Program Results/ Impacts	70% of Core group recipients are actually defined as fuel poor.	41% of recipients actually do use the payment for energy when the benefit is earmarked as a transfer to assist with energy bills (compared to just 3% when it is marked as income alone). One major concern is that this measure fails to target vulnerable groups, as only 26% of recipients are fuel poor.	This policy targets low-income households quite effectively, as it is restricted only to customers receiving certain benefits. Many of these households are also likely to be vulnerable to rising energy bills. From a targeting perspective, this is viewed as a more precise measure than the Winter Fuel Payments. However, it is difficult to predict the number of days of extreme weather on which payments must be made to vulnerable customers, and as such, budgeting can be difficult and imprecise.
	Other	Not available at this time.	Not available at this time.	Not available at this time.

## United States Federal Programs (LIHEAP)

	Program Type	Cash Grant
<b>Overview</b>	Program Name	Low Income Home Energy Assistance Program (LIHEAP)
	Reason/Mechanism for Establishing Program	Originally a response by federal government to skyrocketing costs as a result of Arab oil embargo, and funded with oil overcharge income from oil producers. In 1981, brought into federal budget. Continued year to year to address energy affordability.
<b>Design &amp; Admin.</b>	Utility and/or Program Administrator	Federal government sends block grants [not entitlement program] to states, tribes and territories, most of which sub grant to local agencies, mostly "Community Action Agencies", to administer program. CAAs are private, non-profit corporations, established under state law but in accordance with federal guidelines, to receive and administer certain funds for low-income households and communities. Cities and other local entities provide administration in some areas. "In 2014, all 50 states, the District of Columbia, five U.S. territories (Puerto Rico, Virgin Islands, American Samoa, Commonwealth of the Northern Mariana Islands, and Guam), and 154 tribes or tribal organizations received LIHEAP grants." LIHEAP 101, at 1.
	Intake Process	Conducted by sub grantees. Wide discretion in selecting approach. Valuable alternatives to or additions to information and referral include: (a) matching customer lists with lists of those receiving other means-tested assistance, with automatic enrollment [sometimes with opt-out], (b) unitary application for all benefits - only one application needed, (c) requirements that households seeking utility program assistance apply for LIHEAP for that utility's bills. Households reapply each year. If they are eligible, agency calculates grant per that year's formulae, and typically the award is paid to the energy vendor in the household's name.
	Program Design	Block grant to states, the District of Columbia, territories and commonwealths, and Indian tribal organizations, to fund assistance to low-income households in paying for home energy needs. From APSE: Small portion of federal dollars support leveraging incentive funds to reward states for raising additional funding from nonfederal sources, and funds for demonstration projects that focus on the intersection of energy, health and safety. States have the discretion to use up to 15 percent of their LIHEAP grants (or up to 25 percent with an approved waiver) for weatherization activities." Federal government sets broad policy choices on eligibility and administration, states set state policies within those limits. Typically funds to assist eligible households are paid directly to vendors.
	Delivery Mechanics	"Cash" grant on behalf of participant paid to designated utility, one time per year for regular grant.
	Eligibility Requirements	From APSE: "The LIHEAP statute requires that each grantee set income eligibility thresholds at or below 150 percent of the HHS poverty guidelines or 60 percent of the state median income, provided that no income threshold is lower than 110 percent of the HHS poverty guidelines. Each grantee has the discretion to set the specific income threshold as well as define countable and noncountable income. Grantees also have the option of applying assets tests and creating additional eligibility requirements not related to income." Households with highest energy burden and/or including children/disabled persons/persons 65+ should get priority, but often it is first-come-first served in practice. Must apply each year, but many CAAs send opt-in or opt-out letters to past recipients.
<b>Funding</b>	Funding Source	Federal annual appropriations. In a few cases supplemented by state appropriations. Often administered in tandem with other low-income energy assistance programs, such as utility discount rates.
	How Funding Levels are Established	Congress authorizes and appropriates funds in each year, based on its conception of need, when seen in context of overall budget considerations. States may determine how to distribute the funds [e.g. a little to many households or a lot to fewer households]. The statute provides for two types of funding: regular funds (sometimes referred to as block grant funds) and emergency contingency funds. Regular funds are allocated to grantees based on a formula, while contingency funds may be released to one or more grantees at the discretion of the Secretary of the Department of Health and Human Services based on emergency need. Regular LIHEAP funds are allocated to the states according to a formula that has a long history, and is complicated. When Congress reauthorized LIHEAP in 1984 (P.L. 98-558), it changed the program's formula by requiring the use of more recent population and energy data and requiring that HHS consider both heating and cooling costs of low-income households (a change from the focus on the heating needs of all households). The effect of these changes meant that, in general, funds would be shifted from cold-weather states to warm-weather states. To prevent a dramatic shift of funds, Congress added two "hold-harmless" provisions to the formula. The result of these provisions is a three-tiered formula (sometimes referred to as the "new" formula), the application of which depends on the amount of regular funds that Congress appropriates.
	Funding Dedicated to Program Admin.	State programs limited to 10%. Tribal programs limited to 15% depending on size.
	Entity Receiving Admin. Funding and Why	State agency and program delivery entities [e.g. Community Action agencies.]. To cover administrative costs - note, states and other block grantees have considerable leeway in defining administrative costs.
<b>Other</b>	Program Results/ Impacts	"The historic funding low was in 1996 with just \$900 million in regular funds, supplemented by \$480 million in emergency funds. The historic high was 2009, when the program received \$5.1 billion. Similarly, the number of households served has varied from a low of about 3.6 million in 1999 to a high of 9.5 million in 2011." LIHEAP 101, at 5. The National Energy Assistance Directors' Association (NEADA) representing the state directors of the LIHEAP programs reported that the FY 2013 Congressional budget cuts kept 300,000 families from receiving heating or cooling assistance. NEADA Press Release November 14, 2104. The cuts reduced total funding by about \$155 million [from \$3.47 billion to \$3.32 billion]. As a direct result of that first round of budget cuts, the total number of households receiving home heating assistance declined by 194,000 from 6.9 million in FY 2012 to about 6.7 million in FY 2013 and those receiving cooling assistance declined by about 104,000 from 1.1 million to about 996,000. As a result of budget cuts in recent years the total number of households receiving assistance declined by 17% from about 8.1 million in FY 2010 to 6.7 million in FY 2013. Cuts enacted since FY 2010 have reduced the program's purchasing power from 52.5% of the cost of home heating for the average household to 44% during the 2012-2013 winter heating season. Higher fuel costs and further budget cuts were forecast to drop the purchasing power to 41% of home heating during the 2013-2014 heating season.
	Other	Not available at this time.



## **APPENDIX B: RESEARCH DETAIL BY RESEARCH AREA**

### **Introduction**

Appendix B provides the same detailed results of the research conducted for the jurisdictions provided in Appendix A. However, the information is presented by research area, rather than by jurisdiction.

## Reason / Mechanism for Establishing Program

Jurisdiction	Program Type	Program Name	Reason/Mechanism for Establishing Program
Australia, Federal	Rate Assistance	Energy concessions	Currently, energy concessions and hardship payments for vulnerable customers are provided by State and Territory Governments under the Australian Energy Market Agreement (2006), which opened retail electricity to competition.
	Emergency Assistance	Hardship assistance	Energy concessions and hardship payments for vulnerable customers are provided by State and Territory Governments under the Australian Energy Market Agreement (2006), which opened retail electricity to competition.
	Other (1)	Australia Utility Allowance	Supplement basic assistance grants to those receiving disability support pension, partner allowance or widow allowance.
	Other (2)	Household Assistance Package	Government created a \$15(AU) billion package when carbon tax enacted, to cushion price increase impacts. With the repeal of the carbon tax effective July 1, 2014, the Australian government revised the Clean Energy Supplement, which had been paid automatically to pensioners, families who receive family assistance, and others on government income support. The Clean Energy Supplement was a "sweetener" added to household assistance when the carbon tax was enacted. Originally proposed to be eliminated when the carbon tax was repealed, it was retained, and renamed the "Energy Supplement." In addition, the rate of payment as of 30 June 2014 was fixed for future payments, rather than increasing in future as had been the case with the Clean Energy Supplement.
Australia, Victoria	Rate Assistance	Annual Electricity Concession	The Victorian Hardship Enquiry's Main Report established the following core principles or reasons for supporting vulnerable energy customers: that energy should be provided on 'fair and reasonable' terms, that a legitimate inability to pay should not result in disconnection, and that there is a balance to be struck between consumer welfare and the commercial realities that energy companies face.
	Off-peak concession	Off-peak concession	Introduced in response to large increases in off-peak prices in the early 2000s.
	Other State-specific (1)	Service-to-property-charge	To assist vulnerable customers with rising energy bills by removing monthly charge for line extension.
	Other State-specific (2)	Electricity Transfer Fee Waiver	To assist vulnerable customers wishing to shop for competitive supplier.
California	Rate Assistance	California Alternate Rates for Energy	Commission authorized; statutory requirement and limits; Cal. Pub. Util. Code §382.
	Rate Design (1)	Medical Baseline	To assist customers with medical needs for electricity.
	Rate Design (2)	Family Energy Rate Assistance	To help large families with utility bills.
Colorado	Rate Assistance - PIPP	Percentage of Income Payment	Established in 2012. Mandated by the CPUC which oversees the utilities and regulates the terms.
	State Energy Assistance	Low Income Energy Assistance	To help address declining federal LIHEAP funding.
Illinois	Rate Assistance	Percentage of Income Payment Plan (PIPP)	First required by the Low Income Home Energy Assistance Act of 1981, and amended by Illinois Energy Assistance Act of 1989. The Illinois Energy Assistance Act (IL EAA) details the requirements for low-income energy assistance programs in the state. The IL EAA requires four programs: (1) the energy assistance program, (2) a state weatherization program, (3) the percentage of income payment plan (PIPP or PIP), and (4) an arrearage reduction program as part of the PIPP. The Department of Commerce and Economic Opportunity (DCEO) (the state department that sponsors statewide economic development) has interpreted the IL EAA such that LIHEAP carries out the energy assistance program requirements of the IL EAA. (305 ILCS 20; IL LIHEAP 2014c).
New York	Rate Assistance (2)	ConEd's Low Income Program	Since 1989, the New York PSC has directed the creation and expansion of targeted low-income rate assistance program. The New York legislature has had little involvement.
Pennsylvania	Discount, DSM, credit and collection rules	Customer Assistance Programs (CAPs) Discount	Pennsylvania statute requires protections, policies, and services that assist low-income customers to maintain electric service known as Universal Services and Energy Conservation. This term also includes customer assistance programs, termination of service protection and policies and services that help low-income customers to reduce or manage energy consumption in a cost-effective manner, such as the low-income usage reduction programs, application of renewable resources and consumer education. (PA Title 66, Chapter 28, §§2802(10), 2803). To fulfill the Universal Services and Energy Conservation requirements, the Pennsylvania Public Utility Commission (PA PUC) established standard reporting requirements for the utilities in the state (PA Title 52, Chapter 54, §§ 54.71-54.78). Historically, utilities offered various forms of assistance programs. As part of the transition to deregulated supply markets, universal service programs were defined as part of the statute and made mandatory for larger utilities, although utilities still offer various types of assistance programs.
	Emergency Assistance	Customer Assistance and Referral Evaluation Services (CARES)	Pennsylvania statute requires protections, policies, and services that assist low-income customers to maintain electric service known as Universal Services and Energy Conservation. This term also includes customer assistance programs, termination of service protection and policies and services that help low-income customers to reduce or manage energy consumption in a cost-effective manner, such as the low-income usage reduction programs, application of renewable resources and consumer education. (PA Title 66, Chapter 28, §§2802(10), 2803). To fulfill the Universal Services and Energy Conservation requirements, the Pennsylvania Public Utility Commission (PA PUC) established standard reporting requirements for the utilities in the state (PA Title 52, Chapter 54, §§ 54.71-54.78). Historically, utilities offered various forms of assistance programs. As part of the transition to deregulated supply markets, universal service programs were defined as part of the statute and made mandatory for larger utilities, although utilities still offer various types of assistance programs.
Pennsylvania, PPL	Rate Assistance	PPL Electric Utilities On Track	Competition Acts require Commission to ensure universal service and energy conservation services and to continue, at a minimum, the same level and nature of consumer protection policies and services that were in place at the time the Competition Acts became effective.
Seattle, Washington	Rate Assistance	Seattle Utility Discount Program	City leaders consider Seattle electric rates high, and living costs high and rising, and want to make sure all in City can afford utilities.
United Kingdom	Rate Assistance (1)	Warm Home Discount scheme	To address those who are income poor.
	Rate Assistance (2)	Winter Fuel Payments	To address seniors who are likely to be income/fuel poor.
	Rate Assistance (3)	Cold Weather Payments	To address those who are fuel poor, not necessarily income poor.
US Federal (LIHEAP)	Cash Grant	Low Income Home Energy Assistance Program (LIHEAP)	Originally a response by federal government to skyrocketing costs as a result of Arab oil embargo, and funded with oil overcharge income from oil producers. In 1981, brought into federal budget. Continued year to year to address energy affordability.
	Emergency Assistance	LIHEAP Emergency Assistance	In addition to the block grant, LIHEAP has included emergency contingency funds that may be released by the Secretary of HHS during times of energy price increases or extreme weather (although no contingency funds have been appropriated since 2011).

## Utility and/or Program Administrator

Jurisdiction	Program Type	Program Name	Utility and/or Program Administrator
Australia, Federal	Rate Assistance	Energy concessions	In Australia, energy concessions (payments targeted at vulnerable customers to assist them to pay their energy bills) are predominately provided by state and territory governments and administered by energy retailers as an automatic deduction from energy bills.
	Emergency Assistance	Hardship assistance	The Australian Capitol Territory (ACT), Tasmania and the Northern Territory Governments do not offer direct emergency hardship payments, although retailers in these states do operate hardship programs which involve bill smoothing and payment plans. The ACT has a hardship program operated by the ACT Civil and Administrative Tribunal, and provides an external avenue through which customers experiencing hardship may apply to be put onto a retailer's payment plan or into a hardship program. The Tribunal has the power to direct a retailer to discharge part or all of an outstanding energy bill, including any interest or fees incurred, in exceptional hardship circumstances.
	Other (1)	Australia Utility Allowance	In addition to state concessions, the Australian Government provides an energy concession – known as a Utilities Allowance – for those receiving the disability support pension, partner allowance or widow allowance.
	Other (2)	Household Assistance Package	Usually automatic.
Australia, Victoria	Rate Assistance	Annual Electricity Concession	Department of Human Services
	Off-peak concession	Off-peak concession	Department of Human Services
	Other State-specific (1)	Service-to-property-charge	Department of Human Services
	Other State-specific (2)	Electricity Transfer Fee Waiver	Department of Human Services
California	Rate Assistance	California Alternate Rates for Energy (CARE)	Pacific Gas & Electric/Utilities
	Rate Design (1)	Medical Baseline	Pacific Gas & Electric/Utilities
	Rate Design (2)	Family Energy Rate Assistance program	Pacific Gas & Electric/Utilities
Colorado	Rate Assistance - PIPP	Percentage of Income Payment Plans (PEAP)	Xcel Energy (4 other utilities also provide this program)
	State Energy Assistance	Low Income Energy Assistance Program (LEAP)	Colorado Department of Human Services (CDHS)
Illinois	Rate Assistance	Percentage of Income Payment Plan (PIPP)	Utilities serving more than 100,000 customers as of 1/1/2009 are required to offer the program, which includes Ameren Illinois, ComEd, Nicor Gas, and Peoples Gas/North Shore Gas.
New York	Rate Assistance (1)	Low-Income Rate Assistance (in general)	Administered by the utilities.
	Rate Assistance (2)	ConEd's Low Income Program	Con Edison, with assistance from human services agency eligibility determination or categorically-eligible.
Pennsylvania	Discount, DSM, credit and collection rules	Customer Assistance Programs (CAPs) Discount	The programs are administered by the largest utilities in the state, which includes six electric utilities, seven gas utilities, and one combination electric and gas utility. Each of these utilities is required to submit a universal services plan every three years, which includes a projected needs assessment and projected enrollment level for its universal services programs for the upcoming three years (PA PUC 2012, p 34). The utilities' plans are then reviewed by the PA PUC.
	Emergency Assistance	Customer Assistance and Referral Evaluation Services (CARES)	Same as Discount, LIURP
Pennsylvania, PPL	Rate Assistance	PPL Electric Utilities On Track	Commission's Universal Service and Energy Conservation Reporting Requirements require each large EDC to submit a universal service and energy conservation Plan every 3 years for approval.
Seattle, Washington	Rate Assistance	Seattle Utility Discount Program	Seattle City Light and City of Seattle Human Services Department per Memorandum of Agreement with Seattle City Light utility.
United Kingdom	Rate Assistance (1)	Warm Home Discount scheme	Department of Energy and Climate Change (DECC)/Ofgem/Npower (not every supplier provides this discount to low income customers)
	Rate Assistance (2)	Winter Fuel Payments	Department for Work and Pensions (DWP)
	Rate Assistance (3)	Cold Weather Payments	Department for Work and Pensions (DWP)
US Federal (LIHEAP)	Cash Grant	Low Income Home Energy Assistance Program (LIHEAP)	Federal government sends block grants [not entitlement program] to states, tribes and territories, most of which sub grant to local agencies, mostly "Community Action Agencies", to administer program. CAAs are private, non-profit corporations, established under state law but in accordance with federal guidelines, to receive and administer certain funds for low-income households and communities. Cities and other local entities provide administration in some areas. "In 2014, all 50 states, the District of Columbia, five U.S. territories (Puerto Rico, Virgin Islands, America Samoa, Commonwealth of the Northern Mariana Islands, and Guam), and 154 tribes or tribal organizations received LIHEAP grants." LIHEAP 101, at 1.
	Emergency Assistance	LIHEAP Emergency Assistance	Same as LIHEAP.

## Intake Process

Jurisdiction	Program Type	Program Name	Intake Process
California	Rate Assistance	California Alternate Rates for Energy (CARE)	Application forms can be obtained from the utility, or completed online through the utilities' website. Application forms also are available through numerous community agencies. For PG&E's CARE program, no proof of income is necessary for enrollment. Once a customer's application is approved, they see the CARE/FERA Program and monthly savings listed on the first page of their bill. The CARE discount appears on the bill after the completion of a full billing cycle. Customers receive the discount for two years (or four years if they are on a fixed income). Three months before the discount expires, PG&E sends a letter and re-certification application giving customers the opportunity to reapply if they still qualify under the current program guidelines.
	Rate Design (1)	Medical Baseline	Customers may call utility or apply on line.
	Rate Design (2)	Family Energy Rate Assistance program	Customers may call utility or apply on line.
Colorado	Rate Assistance - PIPP	Percentage of Income Payment Plans (PEAP)	The State LEAP office provides utilities with data on LEAP approved households, which is used for direct outreach to these clients. Xcel Energy created a portal to assist counties with eligibility determination by transmitting daily data on customer heating costs to the state's centralized LIHEAP eligibility processing system.
	State Energy Assistance	Low Income Energy Assistance Program (LEAP)	CDHS sends out a mass mailing of applications prior to the start of the season to all previous year clients. New clients hear about the program through 1) mass media (tv and radio advertising, community columns, call-in with major news stations), 2) county local outreach with community agencies (flyers, brochures, events), 3) state website (w/ access to the application), 4) Program Eligibility Application Kit (PEAK) (website where clients can determine if they are eligible for LEAP) and 5) statewide heat help line where clients can call and get information.
Illinois	Rate Assistance	Percentage of Income Payment Plan (PIPP)	PIPP eligibility is determined by Local Administrative Agencies (LAAs). These are local community action agencies, other community-based organizations or units of local government that implement the LIHEAP at the local level. These agencies are responsible for the provision of outreach, referral, energy-related counseling and educational materials, taking applications, verifying eligibility information and issuing assistance payments to energy vendors. LAAs are required to notify applicants of their eligibility status within 30 days of the date the client application is complete. (DECO 2013, p 4). Applications for PIPPs are handled centrally by the state Department of Commerce and Economic Opportunity's Office of Energy Assistance and not through the individual vendors, but the participating utility companies have helped design the program from its beginning in 2011. The utilities offering PIPPs use a real-time integrated data system in which they enter and track customer information such as Social Security Number and termination status to aid in program administration. (ASPE 2014, p 30).
New York	Rate Assistance (1)	Low-Income Rate Assistance (in	Varies by utility.
	Rate Assistance (2)	ConEd's Low Income Program	The Company pays the out-of-pocket costs for the city and county [NYC and Westchester] Departments of Human Services to run a computer match twice a year of categorically-eligible households and the utility's residential customers. The utility sends a list of residential customers to the agency, which then conducts the computer match. The agency notifies the utility of the matches, and sends a letter advising the customer that she will be enrolled in the low-income program unless she opts out. The utility must enroll the customer within 30 days of receiving the information that the customer is a match.

Jurisdiction	Program Type	Program Name	Intake Process
Pennsylvania	Discount, DSM, credit and collection rules	Customer Assistance Programs (CAPs) Discount	Utilities use a variety of methods to reach customers, and each utility uses a different approach. In general, local agencies and utility support staff communicate directly with eligible customers. They attempt to match customers' needs with existing utility and/or community programs. For example, PPL uses Customer Programs Directors (CPDs), who have responsibility for the day-to-day administration of the utilities universal service programs. PECO uses community partners that provide opportunities and access to resources that offer the assistance that low-income customers may need. Utilities identify potential enrollees through a variety of means such as, customer telephone inquires; when a customer receives energy assistance grants; referrals from community groups, other utilities or state agencies; public outreach sessions, community workshops and advocate-sponsored events for low income customers. After the utility identifies potential enrollees, its asks these customers if they are interested in receiving information about Universal Services programs, and provides information and applications to those who are interested.
	Emergency Assistance	Customer Assistance and Referral Evaluation Services (CARES)	Utilities use a variety of methods to reach customers, and each utility uses a different approach. In general, local agencies and utility support staff communicate directly with eligible customers. They attempt to match customers' needs with existing utility and/or community programs. For example, PPL uses Customer Programs Directors (CPDs), who have responsibility for the day-to-day administration of the utilities universal service programs. PECO uses community partners that provide opportunities and access to resources that offer the assistance that low-income customers may need. Utilities identify potential enrollees through a variety of means such as, customer telephone inquires; when a customer receives energy assistance grants; referrals from community groups, other utilities or state agencies; public outreach sessions, community workshops and advocate-sponsored events for low income customers. After the utility identifies potential enrollees, its asks these customers if they are interested in receiving information about Universal Services programs, and provides information and applications to those who are interested.
Pennsylvania, PPL	Rate Assistance	PPL Electric Utilities On Track	CSRs refer payment-troubled customers to the CBOs. DurMust have proof of income. PPL uses 10 CBOs [2 county government offices and 8 C0mmunity Action Agencies - nonprofits that administer LIHEAP] to administer OnTrack 65 caseworkers at 27 sites.
United Kingdom	Rate Assistance (1)	Warm Home Discount scheme	Automatic, no application is necessary. If a customer meets the conditions set out in law, they will receive a payment or grant. If they are not happy with the decision, they, or someone else who has the authority to act on their behalf, can 1) ask for an explanation, 2) ask for a written statement of reasons for the decision, 3) ask for the agency to look again at the decision or 4) appeal against the decision to an independent tribunal (this must be in writing). Customers can do any or all of these actions.
	Rate Assistance (2)	Winter Fuel Payments	Automatic, no application is necessary. If a customer meets the conditions set out in law, they will receive a payment or grant. If they are not happy with the decision, they, or someone else who has the authority to act on their behalf, can 1) ask for an explanation, 2) ask for a written statement of reasons for the decision, 3) ask for the agency to look again at the decision or 4) appeal against the decision to an independent tribunal (this must be in writing). Customers can do any or all of these actions.
	Rate Assistance (3)	Cold Weather Payments	Automatic, no application is necessary. If a customer meets the conditions set out in law, they will receive a payment or grant. If they are not happy with the decision, they, or someone else who has the authority to act on their behalf, can 1) ask for an explanation, 2) ask for a written statement of reasons for the decision, 3) ask for the agency to look again at the decision or 4) appeal against the decision to an independent tribunal (this must be in writing). Customers can do any or all of these actions. Customers who have recently had a child or are caring for a child younger than five may need to inform the agency that provides these funds.
US Federal (LIHEAP)	Cash Grant	Low Income Home Energy Assistance Program (LIHEAP)	Conducted by sub grantees. Wide discretion in selecting approach. Valuable alternatives to or additions to information and referral include: (a) matching customer lists with lists of those receiving other means-tested assistance, with automatic enrollment [sometimes with opt-out], (b) unitary application for all benefits - only one application needed, (c) requirements that households seeking utility program assistance apply for LIHEAP for that utility's bills. Households reapply each year. If they are eligible, agency calculates grant per that year's formulae, and typically the award is paid to the energy vendor in the household's name.
	Emergency Assistance	LIHEAP Emergency Assistance	Same as LIHEAP.

## Program Design

Jurisdiction	Program Type	Program Name	Program Design
Australia, Federal	Rate Assistance	Energy concessions	Energy concessions (payments targeted at vulnerable customers to assist them to pay their energy bills) are predominately provided by state and territory governments and administered by energy retailers as an automatic deduction from energy bills.
	Emergency Assistance	Hardship assistance	In contrast to regular energy concessions, hardship assistance payments (emergency payments to customers already in financial stress) are provided on a temporary basis.
	Other (1)	Australia Utility Allowance	Flat monthly grant.
	Other (2)	Household Assistance Package	Flat monthly grant.
Australia, Victoria	Rate Assistance	Annual Electricity Concession	17.5% discount on electricity bills
	Off-peak concession	Off-peak concession	13% discount on the off-peak tariff of electricity bills for households with separately metered electric hot water or slab heating. Not available in relation to the flexible or time-of-use tariffs enabled by a smart electricity meter or similar technology.
	Other State-specific (1)	Service-to-property-charge concession	Provides a reduction on the (fixed cents/day) supply charge for concession households with low electricity consumption. The concession is applied if the cost of electricity used is less than the supply (or service) charge. The service charge is then reduced to the same price as the electricity usage cost.
	Other State-specific (2)	Electricity Transfer Fee Waiver	Provides a full waiver of the fee that is normally payable to electricity retailers when there is a change of occupancy at a property.
California	Rate Assistance	California Alternate Rates for Energy (CARE)	30-35% discount off electric bill, depending on utility.
	Rate Design (1)	Medical Baseline	All residential customers are billed a certain amount of their natural gas and electricity use at their utility company's lowest residential rate. This is called the "Baseline Allowance" and it is set depending on what climate zone the home is in and whether it is the utility's "winter" or "summer" season. Extra allowances of natural gas and electricity are billed at the lowest rate for customers who rely on life support equipment, or those who have life threatening illnesses or compromised immune systems. The extra allowances are called Medical Baseline.
	Rate Design (2)	Family Energy Rate Assistance program	Families whose household income slightly exceeds the low-income energy program allowances will qualify to receive FERA discounts, which bills some of their electricity usage at a lower rate. FERA is available for customers of Southern California Edison, San Diego Gas and Electric Company, and Pacific Gas and Electric Company.
Colorado	Rate Assistance - PIPP	Percentage of Income Payment Plans (PEAP)	Monthly reductions in low-income customers' bills, both current and those in arrears. Also educates customers on ways to manage their monthly bill. Participants pay between 2 and 3 percent of their household income, and have the opportunity to have past-due amounts forgiven. Requires participants to be billed 3 percent of their electric bills and 3 percent of their gas bills, bringing their maximum total payment to six percent of income. Arrearage forgiveness plan forgives existing arrears over a 24-month period.
	State Energy Assistance	Low Income Energy Assistance Program (LEAP)	Pays a portion of a customers bill directly to their utility company.
Illinois	Rate Assistance	Percentage of Income Payment Plan (PIPP)	A bill payment assistance program for low-income customers. Participants pay no more than 6 percent of their income for gas and electric service. The maximum PIPP benefit is \$1,800 per year, with a maximum of \$100 per month for the participant's natural gas bill and \$50 for the electric bill. The PIPP program has an arrearage reduction component, which provides participants with a monthly benefit towards their utility bill and a reduction in overdue payments for every on-time payment they make by the bill due date. Participants who make their monthly PIPP payments on time receive a monthly credit amounting to one twelfth of their past due bills, up to \$1,000 total per year for both gas and electric bills. (305 ILCS 20/18, (c)(5); IL LIHEAP 2014c). The PIPP includes client education to inform customers about the PIPP and about their rights and responsibilities under the program. If clients miss their payments, the local agencies attempt to contact them and help them stay on the program. (IL LIHEAP 2014c).

Jurisdiction	Program Type	Program Name	Program Design
New York	Rate Assistance (1)	Low-Income Rate Assistance (in general)	Discounts off the basic monthly service charge for electricity and/or gas. Monthly discounts range from \$2 to \$24 off the monthly fixed customer charge. Some gas companies provide discounts on consumption up to a specified level. For example, Con Edison provides a 50 percent discount on the first 90 therms to 165,000 customers. Some of these programs offer arrearage forgiveness and case management as well. For example, KeySpan's "On-Track" program provides financial assistance, education, and energy and financial management to a limited number of low-income customers. Customers on the payment plan may receive credits on past due accounts.
	Rate Assistance (2)	ConEd's Low Income Program	Flat dollar reduction off monthly bill, plus waiver of reconnection fees.
Pennsylvania	Discount, DSM, credit and collection rules	Customer Assistance Programs (CAPs) Discount	An alternative collection method that provides payment assistance. CAP participants agree to make regular monthly payments that are for an amount that is less than the current bill in exchange for continued provision of electric utility services. The individual programs do have some variances from the CAP Policy Statement. One area in particular that may vary is the amount of the maximum CAP credit. The CAP discount has an arrearage forgiveness component, which is provided generally over a two to three year period. The customer receives arrearage forgiveness for each on-time, in full CAP payment received. The structure and exact requirements of the arrearage forgiveness program is established on a case by case basis through plan filings.
	Emergency Assistance	Customer Assistance and Referral Evaluation Services (CARES)	This program helps selected, payment-troubled customers maximize their ability to pay utility bills. Provides a casework approach to help customers secure energy assistance funds and other needed services. The structure and requirements of the CARES program varies from utility to utility. For example, the emphasis of NFG's CARES Program is towards those customers with short-term and temporary hardships. Qualifying households may receive counseling and/or direct referrals to community resources that can aid in resolving the emergency.
Pennsylvania, PPL	Rate Assistance	PPL Electric Utilities On Track	Primary features: Reduced payment arrangement based on ability to pay [flat monthly payment at program-determined level]. Arrearage forgiveness over 18 mos. Protection against shutoff of electric service. Referrals to other programs and services PL Electric establishes an 18-month debt forgiveness plan. 4 major purposes: 1. Improve customers' bill payment habits and attitudes; 2. Stabilize or reduce customers' energy usage; 3. Eliminate uncollectible balances for program participants; and 4. Provide the customer with other beneficial services and/or programs through a network CBOs.
Seattle, Washington	Rate Assistance	Seattle Utility Discount Program	60% discount off electricity bill [Note: Seattle Public Utilities offers companion 50% discount from water/sewer/trash removal bills].
United Kingdom	Rate Assistance (1)	Warm Home Discount scheme	An annual rebate of £140 provided to vulnerable customers in or at risk of fuel poverty.
	Rate Assistance (2)	Winter Fuel Payments	Annual tax-free cash transfers of between £100-300 to seniors. The amount paid depends on where you live (i.e., care facility or at home), how many people you live with and the ages of those people. These living conditions are assessed during one qualifying week per year. There is no customer obligation to spend any of the payment on energy.
	Rate Assistance (3)	Cold Weather Payments	£25 to vulnerable customers for each seven day period of "very cold weather" between 1 November and 31 March. Vulnerable customers are defined as those on income support or those who receive pension credit and are disabled, have a child who is disabled, or are raising a child younger than five years old. Very cold weather is defined as when the local temperature is either recorded as, or forecast to be, an average of zero degrees Celsius or below over 7 consecutive days.
US Federal (LIHEAP)	Cash Grant	Low Income Home Energy Assistance Program (LIHEAP)	Block grant to states, the District of Columbia, territories and commonwealths, and Indian tribal organizations, to fund assistance to low-income households in paying for home energy needs. From APSE: Small portion of federal dollars support leveraging incentive funds to reward states for raising additional funding from nonfederal sources, and funds for demonstration projects that focus on the intersection of energy, health and safety. States have the discretion to use up to 15 percent of their LIHEAP grants (or up to 25 percent with an approved waiver) for weatherization activities." Federal government sets broad policy choices on eligibility and administration, states set state policies within those limits. Typically funds to assist eligible households are paid directly to vendors.
	Emergency Assistance	LIHEAP Emergency Assistance	The 1998 reauthorization of LIHEAP added a new section that specified additional conditions under which LIHEAP emergency funds could be released, to include: 'a natural disaster, any other event meeting criteria the Secretary determines appropriate, or a significant increase in: (1) home energy supply shortages or disruptions; (2) the cost of home energy;(3) home energy disconnections; (4) participation in a public benefit program such as the food stamp program; or (5) a significant increase in unemployment or layoffs.' LIHEAP 101, at 4.

## Delivery Mechanics

Jurisdiction	Program Type	Program Name	Delivery Mechanics
Australia, Federal	Emergency Assistance	Hardship assistance	Administration of hardship payments varies by jurisdiction. Hardship assistance is either directly provided by state governments or distributed in partnership with electricity retailers and charitable organizations such as St Vincent de Paul and the Salvation Army. The ACT has a hardship program operated by the ACT Civil and Administrative Tribunal.
Australia, Victoria	Rate Assistance	Annual Electricity Concession	Utility applies discount/government pays for discounts.
	Off-peak concession	Off-peak concession	Utility applies discount/government pays for discounts.
	Other State-specific (1)	Service-to-property-charge concession	Utility applies discount/government pays for discounts.
	Other State-specific (2)	Electricity Transfer Fee Waiver	Utility applies discount/government pays for discounts.
California	Rate Assistance	California Alternate Rates for Energy (CARE)	Utility renders discounted bill.
	Rate Design (1)	Medical Baseline	Utility renders discounted bill.
	Rate Design (2)	Family Energy Rate Assistance program	Utility renders discounted bill.
Colorado	Rate Assistance - PIPP	Percentage of Income Payment Plans (PEAP)	Utilities manage the program.
	State Energy Assistance	Low Income Energy Assistance Program (LEAP)	CDHS manages the program.
Illinois	Rate Assistance	Percentage of Income Payment Plan (PIPP)	The DCEO remits, through the LAAs, to the utility or participating alternative supplier that portion of the plan participant's bill that is not the responsibility of the participant. Essentially, the DCEO collects program funding (as described below), determines the customer's program eligibility, and pays the funding to the utility on behalf of the customer.
New York	Rate Assistance (1)	Low-Income Rate Assistance (in general)	Varies by utility.
	Rate Assistance (2)	ConEd's Low Income Program	Company has billing software to compute effect of discount off participating customers' bills.
Pennsylvania	Discount, DSM, credit and collection rules	Customer Assistance Programs (CAPs) Discount	Payments are made directly to companies on behalf of eligible customers.
	Emergency Assistance	Customer Assistance and Referral Evaluation Services (CARES)	As utilities have expanded their CAP programs, the focus of CARES has changed, and is now a component of CAP. CARES is a component of CAP for each of the utilities that are required to maintain a CAP program.
Pennsylvania, PPL	Rate Assistance	PPL Electric Utilities On Track	Presently 5 methods for determining affordable amount. All have effect of relating pmt requirement to customer's % of FPL. Small charge to defray part of back balances.
Seattle, Washington	Rate Assistance	Seattle Utility Discount Program	Rendered bill is regular rate discounted 60%.
United Kingdom	Rate Assistance (1)	Warm Home Discount scheme	DECC is currently coordinating aid to the Core Group of eligible, Ofgem the remaining three. The Scheme is divided into four groups, namely the Core Group, the Broader Group, Legacy Spend and Industry Initiatives. The Core group and Broader group are the two major components of the scheme.
	Rate Assistance (2)	Winter Fuel Payments	Payments are made directly into the customer's nominated bank account, without restriction on how they are spent.
	Rate Assistance (3)	Cold Weather Payments	Monitored by the DWP. Benefits are paid automatically into the same customer account as the one in which they receive their benefit payments. Customers receive payments within 14 working days after each period of cold weather. Participation in this program does not preclude participation in any of the other programs.
US Federal (LIHEAP)	Cash Grant	Low Income Home Energy Assistance Program (LIHEAP)	"Cash" grant on behalf of participant paid to designated utility, one time per year for regular grant.
	Emergency Assistance	LIHEAP Emergency Assistance	Same as LIHEAP.

## Eligibility Requirements

Jurisdiction	Program Type	Program Name	Eligibility Requirements
Australia, Federal	Emergency Assistance	Hardship assistance	In some states, payment eligibility is assessed by community welfare organizations on the basis of circumstances rather than automatic eligibility as a result of holding a Commonwealth concession card.
	Other (1)	Australia Utility Allowance	Not available at this time.
	Other (2)	Household Assistance Package	Given to pensioners, families who receive assistance and those on income support.
Australia, Victoria	Rate Assistance	Annual Electricity Concession	Commonwealth Concession card. Many of Australia's assistance programs are connected to concession cards, which are identification cards related to health care, seniors, students, veterans, low-income, and other types of situations that cause customers to be on low or fixed incomes.
	Off-peak concession	Off-peak concession	Commonwealth concession card.
	Other State-specific (1)	Service-to-property-charge concession	Commonwealth concession card.
	Other State-specific (2)	Electricity Transfer Fee Waiver	Commonwealth concession card.
California	Rate Assistance	California Alternate Rates for Energy (CARE)	Customers with incomes under 200% of the Federal Poverty Levels are eligible for CARE. Customers may also qualify if they are enrolled in public assistance programs such as Medicaid/Medi-Cal, Women, Infants and Children Program (WIC), Healthy Families A & B, National School Lunch's Free Lunch Program (NSL), Food Stamps/SNAP, Low Income Home Energy Assistance Program (LIHEAP), Head Start Income Eligible (Tribal Only), Supplemental Security Income (SSI), Bureau of Indian Affairs General Assistance, and Temporary Assistance for Needy Families (TANF) or Tribal TANF. CARE is also available to the following PG&E customers: Tenants of Sub-Metered Residential Facilities Qualified Non-Profit Group Living Facilities Agricultural Employee Housing Facilities Migrant Farm Worker Housing Facilities.
	Rate Design (1)	Medical Baseline	Customers with household member needing life-support equipment. "Life support equipment" means equipment that uses mechanical or artificial means to sustain, restore, or supplant a vital function, or mechanical equipment that is relied upon for mobility both within and outside of buildings. This includes: All types of respirators, iron lungs, hemodialysis machines, suction machines, electric nerve stimulators, pressure pads and pumps, aerosol tents, electrostatic and ultrasonic nebulizers, compressors, IPBB machines and motorized wheelchairs. Also, in consideration of their increased heating and cooling needs, the Medical Baseline allowance is available to paraplegics and quadriplegics, multiple sclerosis patients, scleroderma patients, and people being treated for a life threatening illness or who have a compromised immune system.
	Rate Design (2)	Family Energy Rate Assistance program	Families whose household income slightly exceeds the low-income energy program allowances will qualify to receive FERA discounts, which bills some of their electricity usage at a lower rate. FERA is available for customers of Southern California Edison.
Colorado	Rate Assistance - PIPP	Percentage of Income Payment Plans (PEAP)	LEAP approved households.
	State Energy Assistance	Low Income Energy Assistance Program (LEAP)	150% FPG. Eligibility is based on household income and federal poverty guidelines. Those approved for this program may also receive Emergency Assistance.
Illinois	Rate Assistance	Percentage of Income Payment Plan (PIPP)	Up to 150 percent of federal poverty guidelines. The DCEO establishes the specific eligibility levels, and in so doing considers factors such as economic conditions, state and federal funding levels, and energy costs. PIPP eligibility is based on whether the customer is on retail competition, and whether their supply vendor collects the SLEAF charge. If the vendor does not collect the charge, then the customer cannot receive benefits from that funding source. PIPP participants have the option of signing up for PIPP or receiving a one-time direct vendor payment, either through LIHEAP funds or the ratepayer (meters charge) funds. If a customer participates in PIPP, it cannot participate in another energy assistance program for the year. (305 ILCS 20/18, (c)(2)).

Jurisdiction	Program Type	Program Name	Eligibility Requirements
New York	Rate Assistance (1)	Low-Income Rate Assistance (in general)	For most programs, households in receipt of or eligible for LIHEAP are automatically enrolled into the program.
	Rate Assistance (2)	ConEd's Low Income Program	Customers enrolled in the Utility Guarantee or Direct Vendor programs administered by local human resource agencies; receive benefits under Temporary Assistance for Needy Persons/Families, Safety Net Assistance, Supplemental Security Income, or the Supplemental Nutrition Assistance Program; or received a Home Energy Assistance Program [LIHEAP] grant in the last twelve months. In last rate case, low-income advocates urged that Medicaid receipt be added to the list of programs receipt of which make a customer "categorically eligible." The PSC deferred its decision, pending research to estimate how many Medicaid eligible customers are served by Con Edison that are not already participants in the electric low-income program. On August 21, Con Edison provided those numbers, along with its analysis of how its low-income program budget could adapt to any anticipated changes in volume.
Pennsylvania	Discount, DSM, credit and collection rules	Customer Assistance Programs (CAPs) Discount	At or below 150 percent of federal poverty guidelines; must have made a payment agreement with their utility. The CAP Policy Statement states that customers should apply for LIHEAP. The LIHEAP grant may be applied to either the electric or natural gas account. There is not a requirement that customers receive a LIHEAP grant in order to participate in CAP.
	Emergency Assistance	Customer Assistance and Referral Evaluation Services (CARES)	Payment-troubled customers. CARES is about referring CAP customers to other available resources in the community. For example, PECO's CARES program directs its CARES resources to customers at or below 50% of the Federal Poverty Level (FPL). PECO's CARES resources are provided for customers who are low-income; have "special needs" which are defined as CAP customers below 50% of the Federal Poverty Level; and have extenuating circumstances. NFG's CARES Program, however, directs its resources to low income, fixed income, special needs, and payment troubled customers who are experiencing short-term financial hardships. The CAP Policy Statement states that customers should apply for LIHEAP. The LIHEAP grant may be applied to either the electric or natural gas account. There is not a requirement that customers receive a LIHEAP grant in order to participate in CARES. CARES provides information about resources available in the community, and LIHEAP may be one of those resources available.
Pennsylvania, PPL	Rate Assistance	PPL Electric Utilities On Track	Act does not define "affordability;" PAPUC Policy Statement provides guidance. PPL's CAP available to customers with incomes at or below 150% of the FPL, and who are "payment-troubled."
Seattle, Washington	Rate Assistance	Seattle Utility Discount Program	Seattle City Light customer, $\neq$ <70% of state minimum income, not living in subsidized housing.
United Kingdom	Rate Assistance (1)	Warm Home Discount scheme	The Core Group is comprised of poorer pensioner households identified by the Department of Work and Pensions (DWP). The DWP shares information about recipients of Pension Credits with retailers. Eligible Core group members receive an automatic annual rebate on their energy bill. Customers must apply to be a member of the Broader Group and they must receive certain additional benefits to be eligible. Suppliers are also required to provide annual rebates to these customers, but suppliers set the eligibility criteria, in line with WHD regulations. As an example, Npower's customers are considered part of the Broader Group if they receive any of 1) Income support/Income based jobseeker's allowance/income related employment and support allowance; 2) and one of Child tax credit/disability premium/Disability Living Allowance/Long Term Incapacity Benefit.
	Rate Assistance (2)	Winter Fuel Payments	Customers are eligible if they are recipients of State pensions or another social security benefit (excluding Housing Benefit, Council Tax Benefit and Child Benefit). Generally, they are eligible if they were born on or before July 5, 1951 (date changes every year) and normally live in the UK throughout the coldest week in September. The amount available depends on whether the customer meets certain additional criteria. For example, eligible customers aged 80 or over on a Pension Credit will receive £300, whereas an eligible customer living with someone who also qualifies will receive just £100.
	Rate Assistance (3)	Cold Weather Payments	Customers are generally eligible if they receive benefits including Pension Credit, Income Support, Jobseeker's Allowance (assuming they meet sub-criteria such as receiving a Child Tax Credit), and Employment and Support Allowance (assuming they meet sub-criteria such as receiving a severe or enhanced disability premium).
US Federal (LIHEAP)	Cash Grant	Low Income Home Energy Assistance Program (LIHEAP)	From APSE: "The LIHEAP statute requires that each grantee set income eligibility thresholds at or below 150 percent of the HHS poverty guidelines or 60 percent of the state median income, provided that no income threshold is lower than 110 percent of the HHS poverty guidelines. Each grantee has the discretion to set the specific income threshold as well as define countable and noncountable income. Grantees also have the option of applying assets tests and creating additional eligibility requirements not related to income." Households with highest energy burden and/or including children/disabled persons/persons 65+ should get priority, but often it is first-come-first served in practice. Must apply each year, but many CAAs send opt-in or opt-out letters to past recipients.
	Emergency Assistance	LIHEAP Emergency Assistance	Same as LIHEAP.

## Funding Source

Jurisdiction	Program Type	Program Name	Funding Source
Australia, Victoria	Rate Assistance	Annual Electricity Concession	Government
	Off-peak concession	Off-peak concession	Government
	Other State-specific (1)	Service-to-property-charge concession	Government
	Other State-specific (2)	Electricity Transfer Fee Waiver	Government
California	Rate Assistance	California Alternate Rates for Energy (CARE)	All ratepayers via nonbypassable volumetric charge on distribution services.
	Rate Design (1)	Medical Baseline	Residential cost responsibility is redistributed in rate design process.
	Rate Design (2)	Family Energy Rate Assistance program	All ratepayers - nonbypassable volumetric distribution charge.
Colorado	Rate Assistance - PIPP	Percentage of Income Payment Plans (PEAP)	Customer surcharges.
	State Energy Assistance	Low Income Energy Assistance Program (LEAP)	LIHEAP funding from the state as well as private funds from oil and gas companies, foundations, and private donations.
Illinois	Rate Assistance	Percentage of Income Payment Plan (PIPP)	There are two sources of funding for this program. The Supplemental Low-Income Energy Assistance Fund (SLEAF) is funded by voluntary donations from individuals, foundations, corporations, and other sources. The Energy Assistance Charge collects funds from all ratepayers to fund the assistance programs.
New York	Rate Assistance (1)	Low-Income Rate Assistance (in general)	Funded through utility rates recovered from all customer classes.
	Rate Assistance (2)	ConEd's Low Income Program	Funded through utility rates recovered from all customer classes.
Pennsylvania	Discount, DSM, credit and collection rules	Customer Assistance Programs (CAPs) Discount	Program costs are included in utility rates as part of the distribution cost passed on to all residential customers. The costs may be collected through distribution base rates and/or a universal service surcharge mechanism.
	Emergency Assistance	Customer Assistance and Referral Evaluation Services (CARES)	CARES is funded as part of the universal service program surcharge. It is not funded by LIHEAP cash and crisis grants.
Pennsylvania, PPL	Rate Assistance	PPL Electric Utilities On Track	PAPUC must ensure that the utilities run the programs in a cost-effective manner. Utilities recover approved costs through universal service charge on all customers.
Seattle, Washington	Rate Assistance	Seattle Utility Discount Program	Cost allocation in rates; i.e. other ratepayers.
United Kingdom	Rate Assistance (1)	Warm Home Discount scheme	Energy suppliers
	Rate Assistance (2)	Winter Fuel Payments	The Social Fund
	Rate Assistance (3)	Cold Weather Payments	The Social Fund
US Federal (LIHEAP)	Cash Grant	Low Income Home Energy Assistance Program (LIHEAP)	Federal annual appropriations. In a few cases supplemented by state appropriations. Often administered in tandem with other low-income energy assistance programs, such as utility discount rates.
	Emergency Assistance	LIHEAP Emergency Assistance	Same as LIHEAP.

## How Funding Levels are Established

Jurisdiction	Program Type	Program Name	How Funding Levels are Established
Australia, Federal	Emergency Assistance	Hardship assistance	Hardship payments are more variable in nature among the states than regular concessions, with amounts paid on a case-by-case basis, as assessed by the relevant department.
Australia, Victoria	Rate Assistance	Annual Electricity Concession	Budget Process
	Off-peak concession	Off-peak concession	Budget Process
	Other State-specific (1)	Service-to-property-charge concession	Budget Process
	Other State-specific (2)	Electricity Transfer Fee Waiver	Budget Process
California	Rate Assistance	California Alternate Rates for Energy (CARE)	Low Income needs assessment as required by Cal. Pub. Util. Code §382(d); participation of customers and effect of applicable discounts.
	Rate Design (1)	Medical Baseline	Function of participation and associated rates.
	Rate Design (2)	Family Energy Rate Assistance program	Function of participation and associated rates.
Illinois	Rate Assistance	Percentage of Income Payment Plan (PIPP)	Funding levels are based on availability for each funding source. The SLEAF level of funding is based on the donations provided. The Energy Assistance Charge is as follows: residential customers are charged \$0.48 a month, small C&I customers are charged \$4.80 a month, and large C&I customers are charged \$360 a month.
New York	Rate Assistance (1)	Low-Income Rate Assistance (in general)	Rate cases and settlements.
	Rate Assistance (2)	ConEd's Low Income Program	In most recent rate case, 13-E-0030, order issued 2-14-14, all but low-income intervenors agreed to settlement that would set the budget at \$[US] 47.5 million, assuming a \$9.50 per month per participant bill reduction (up from \$8.50), and the program having on average, approximately 417,000 customers. Con Edison reported in August that adding Medicaid as qualifying means-tested program for categorical eligibility would add 129,000 more customers to program. Assuming same \$9.50 credit for all participants, the budget would have to increase by about \$15 million, to \$65.2 million for rate credits. The Commission has not ruled on the issue.
Pennsylvania	Discount, DSM, credit and collection rules	Customer Assistance Programs (CAPs) Discount	CAP Programs must be cost-effective, but there is no specific formula for establishing the budget level for the CAP programs. The budgets are determined on a case by case basis by the PA PUC. The utilities presents a proposed budget in its three-year Universal Service and Energy Conservation Plan. In that proceeding, the utilities will present a Needs Assessment based on the company's current CAP enrollment levels and the U.S. Census results in the service territory. In the filing, the utility will make a proposal about how much to ramp up the program each year, and the parties will evaluate the proposal and may make recommendations in the case. The size and costs of the programs varies depending upon the needs of the service territory and from utility to utility. Funding levels are sometimes negotiated as part of disposition of rate cases or other dockets, such as merger applications.
	Emergency Assistance	Customer Assistance and Referral Evaluation Services (CARES)	CAP Programs must be cost-effective, but there is no specific formula for establishing the budget level for the CAP programs. The budgets are determined on a case by case basis by the PA PUC. The utilities presents a proposed budget in its three-year Universal Service and Energy Conservation Plan. In that proceeding, the utilities will present a Needs Assessment based on the company's current CAP enrollment levels and the U.S. Census results in the service territory. In the filing, the utility will make a proposal about how much to ramp up the program each year, and the parties will evaluate the proposal and may make recommendations in the case. The size and costs of the programs varies depending upon the needs of the service territory and from utility to utility. Funding levels are sometimes negotiated as part of disposition of rate cases or other dockets, such as merger applications.
Pennsylvania, PPL	Rate Assistance	PPL Electric Utilities On Track	The Company has proposed CAP expenditure funding of approximately \$56.6 million in 2014, \$62.8 million in 2015, and \$65.4 million in 2016.
Seattle, Washington	Rate Assistance	Seattle Utility Discount Program	Utility's rates are set every 2 years by mayor and city council.
United Kingdom	Rate Assistance (1)	Warm Home Discount scheme	The Warm Home Discount Scheme that came into effect on April 1, 2011 provides £1.13b to fuel poor customers over the four years until 2015.
	Rate Assistance (2)	Winter Fuel Payments	Mandated by law.
	Rate Assistance (3)	Cold Weather Payments	Mandated by law.
US Federal (LIHEAP)	Cash Grant	Low Income Home Energy Assistance Program (LIHEAP)	Congress authorizes and appropriates funds in each year, based on its conception of need, when seen in context of overall budget considerations. States may determine how to distribute the funds [e.g. a little to many households or a lot to fewer households]. The statute provides for two types of funding: regular funds (sometimes referred to as block grant funds) and emergency contingency funds. Regular funds are allocated to grantees based on a formula, while contingency funds may be released to one or more grantees at the discretion of the Secretary of the Department of Health and Human Services based on emergency need. Regular LIHEAP funds are allocated to the states according to a formula that has a long history, and is complicated. When Congress reauthorized LIHEAP in 1984 (P.L. 98-558), it changed the program's formula by requiring the use of more recent population and energy data and requiring that HHS consider both heating and cooling costs of low-income households (a change from the focus on the heating needs of all households). The effect of these changes meant that, in general, funds would be shifted from cold-weather states to warm-weather states. To prevent a dramatic shift of funds, Congress added two "hold-harmless" provisions to the formula. The result of these provisions is a three-tiered formula (sometimes referred to as the "new" formula), the application of which depends on the amount of regular funds that Congress appropriates.
	Emergency Assistance	LIHEAP Emergency Assistance	Same as LIHEAP.

## Funding Dedicated to Program Administration

Jurisdiction	Program Type	Program Name	Funding Dedicated to Program Administration
Illinois	Rate Assistance	Percentage of Income Payment Plan (PIPP)	The amount of the SLEAF funds spent on administrative expenses in a year must not exceed 10 percent of the amount collected during that year. Illinois utilities were required to pay a one-time payment of \$22 million with the passage of the IL EAA. These funds were used for the DCEO's cost of program implementation. It is not clear if administrative requirements are associated with the Energy Assistance Charge.
New York	Rate Assistance (1)	Low-Income Rate Assistance (in general)	Varies by utility.
	Rate Assistance (2)	ConEd's Low Income Program	See <a href="#">How Funding Levels are Established</a> .
Pennsylvania	Discount, DSM, credit and collection rules	Customer Assistance Programs (CAPs) Discount	In 2011 and again in 2012, the utilities' weighted average spending on administration costs was 4% of overall costs.
	Emergency Assistance	Customer Assistance and Referral Evaluation Services (CARES)	In 2011 and again in 2012, the utilities' weighted average spending on administration costs was 4% of overall costs.
Pennsylvania, PPL	Rate Assistance	PPL Electric Utilities On Track	Most recent 3-Year Plan recites intention to bring collection functions in house to save money.
Seattle, Washington	Rate Assistance	Seattle Utility Discount Program	2014 budget - \$8.1 million (including \$87.85 per client for SPU admin).
United Kingdom	Rate Assistance (2)	Winter Fuel Payments	Department for Work and Pensions (DWP), possibly others
	Rate Assistance (3)	Cold Weather Payments	Department for Work and Pensions (DWP), possibly others
US Federal (LIHEAP)	Cash Grant	Low Income Home Energy Assistance Program (LIHEAP)	State programs limited to 10%. Tribal programs limited to 15% depending on size.
	Emergency Assistance	LIHEAP Emergency Assistance	Same as LIHEAP.

## Entity Receiving Administration Funding and Why

Jurisdiction	Program Type	Program Name	Entity Receiving Administration Funding and Why
Colorado	Rate Assistance - PIPP	Percentage of Income Payment Plans (PEAP)	Each of the five largest utility companies maintains departments dedicated to working with their low-income clients to ensure those households get the heating they need and can manage their bill payments.
Illinois	Rate Assistance	Percentage of Income Payment Plan (PIPP)	Funding is eventually transferred to the Department of Commerce and Economic Opportunity, but may be collected through utilities or through the State Treasury.
New York	Rate Assistance (1)	Low-Income Rate Assistance (in general)	Utilities plus any contract assistance (e.g. intake).
	Rate Assistance (2)	ConEd's Low Income Program	Con Ed staffing is part of O&M in base rates. Small payment for matching and opt-out letters is made to agencies.
Pennsylvania	Discount, DSM, credit and collection rules	Customer Assistance Programs (CAPs) Discount	Utilities receive administrative funding as they are the ones that implement the programs.
	Emergency Assistance	Customer Assistance and Referral Evaluation Services (CARES)	Utilities receive administrative funding as they are the ones that implement the programs.
Pennsylvania, PPL	Rate Assistance	PPL Electric Utilities On Track	Utility through Universal Service Charge; CBOs through contracts with utility.
Seattle, Washington	Rate Assistance	Seattle Utility Discount Program	Seattle City Light has 9 FTEs; Human Services Department has 13.5 FTEs for electricity and water/sewer MOA work combined. SCL and SDP split MOA admin costs 56/44 based on relative size of customer base.
US Federal (LIHEAP)	Cash Grant	Low Income Home Energy Assistance Program (LIHEAP)	State agency and program delivery entities [e.g. Community Action agencies.]. To cover administrative costs - note, states and other block grantees have considerable leeway in defining administrative costs.
	Emergency Assistance	LIHEAP Emergency Assistance	Same as LIHEAP.

## Program Results / Impacts

Jurisdiction	Program Type	Program Name	Program Results/ Impacts
Australia, Federal	Rate Assistance	Energy concessions	Analysis by consulting firm hired by Energy Supply Association of Australia concludes that four potentially vulnerable customer groups are at risk of "falling through the cracks": Family Formation Group (e.g. young families with small children), single renters with low income, regional (non-urban) customers with low income not connected to the energy network (mostly delivered gas customers but also some master-metered electricity customers), and new home buyers with low after-housing-cost income).
	Emergency Assistance	Hardship assistance	Analysis by consulting firm hired by Energy Supply Association of Australia concludes that four potentially vulnerable customer groups are at risk of "falling through the cracks": Family Formation Group, single renters with low income, regional (non-urban) customers with low income not connected to the energy network (mostly delivered gas customers but also some master-metered electricity customers), and new home buyers with low after-housing-cost income).
Colorado	Rate Assistance - PIPP	Percentage of Income Payment Plans (PEAP)	8,500 households assisted.
	State Energy Assistance	Low Income Energy Assistance Program (LEAP)	90,000 households served in the 2013-2014 program year with an average benefit of \$438.
Illinois	Rate Assistance	Percentage of Income Payment Plan (PIPP)	For FY 2012, the program enrolled over 37,000 households and spent \$21.6 million for PIPP benefits and another \$37.3 million for direct vendor payments to PIPP households. At the end of FY 2013, at least \$35 million had been obligated on behalf of about 52,000 participants. From 2011 to 2012, there was a 6% decrease in residential electric terminations.
New York	Rate Assistance (1)	Low-Income Rate Assistance (in general)	As of mid-2013, the state's major electric and gas companies were providing about \$112 million annually for low-income rate assistance programs that assisted over one million households.
	Rate Assistance (2)	ConEd's Low Income Program	In most recent year, 417,000 customers were enrolled.
Pennsylvania	Discount, DSM, credit and collection rules	Customer Assistance Programs (CAPs) Discount	Electric CAP spending for 2012 totaled \$234.4 million and gas CAP spending was \$105.3 million, with 309,570 customers enrolled in electric utility programs and 175,015 in gas utility programs. In 2011, electric CAPs spent \$250 million and enrolled 306,213 households, and gas CAPs spent \$151.7 million and enrolled 189,690. In 2012, 37% of electric arrearages (in dollars) were on an agreement plan.
	Emergency Assistance	Customer Assistance and Referral Evaluation Services (CARES)	Electric CAP spending for 2012 totaled \$234.4 million and gas CAP spending was \$105.3 million, with 309,570 customers enrolled in electric utility programs and 175,015 in gas utility programs. In 2011, electric CAPs spent \$250 million and enrolled 306,213 households, and gas CAPs spent \$151.7 million and enrolled 189,690. In 2012, 37% of electric arrearages (in dollars) were on an agreement plan.
Seattle, Washington	Rate Assistance	Seattle Utility Discount Program	2014 expected average benefit: \$8.8 million/16,800 participants = \$524
United Kingdom	Rate Assistance (1)	Warm Home Discount scheme	70% of Core group recipients are actually defined as fuel poor.
	Rate Assistance (2)	Winter Fuel Payments	41% of recipients actually do use the payment for energy when the benefit is earmarked as a transfer to assist with energy bills (compared to just 3% when it is marked as income alone). One major concern is that this measure fails to target vulnerable groups, as only 26% of recipients are fuel poor.
	Rate Assistance (3)	Cold Weather Payments	This policy targets low-income households quite effectively, as it is restricted only to customers receiving certain benefits. Many of these households are also likely to be vulnerable to rising energy bills. From a targeting perspective, this is viewed as a more precise measure than the Winter Fuel Payments. However, it is difficult to predict the number of days of extreme weather on which payments must be made to vulnerable customers, and as such, budgeting can be difficult and imprecise.
US Federal (LIHEAP)	Cash Grant	Low Income Home Energy Assistance Program (LIHEAP)	"The historic funding low was in 1996 with just \$900 million in regular funds, supplemented by \$480 million in emergency funds. The historic high was 2009, when the program received \$5.1 billion. Similarly, the number of households served has varied from a low of about 3.6 million in 1999 to a high of 9.5 million in 2011." LIHEAP 101, at 5. The National Energy Assistance Directors' Association (NEADA) representing the state directors of the LIHEAP programs reported that the FY 2013 Congressional budget cuts kept 300,000 families from receiving heating or cooling assistance. NEADA Press Release November 14, 2104. The cuts reduced total funding by about \$155 million [from \$3.47 billion to \$3.32 billion]. As a direct result of that first round of budget cuts, the total number of households receiving home heating assistance declined by 194,000 from 6.9 million in FY 2012 to about 6.7 million in FY 2013 and those receiving cooling assistance declined by about 104,000 from 1.1 million to about 996,000. As a result of budget cuts in recent years the total number of households receiving assistance declined by 17% from about 8.1 million in FY 2010 to 6.7 million in FY 2013. Cuts enacted since FY 2010 have reduced the program's purchasing power from 52.5% of the cost of home heating for the average household to 44% during the 2012-2013 winter heating season. Higher fuel costs and further budget cuts were forecast to drop the purchasing power to 41% of home heating during the 2013-2014 heating season.
	Emergency Assistance	LIHEAP Emergency Assistance	Since 1984, LIHEAP Emergency Funds have been released to grantees nearly two dozen times for reasons such as energy price increases, extremely hot or cold weather, and damages caused by natural disasters. LIHEAP 101, at 4. "It is important to note that, historically, LIHEAP has served less than 20 percent of eligible households... The 2009 Home Energy Notebook, the latest for which official data have been compiled, says that the average has remained fairly steady at around 17 percent since 1997." LIHEAP 101 at 5.

## Other Information

Jurisdiction	Program Type	Program Name	Other Information
Australia, Federal	Other (2)	Household Assistance Package	Australian Government has proposed welfare changes to make it harder to receive aide if able to work.
Australia, Victoria	Other State-specific (1)	Service-to-property-charge concession	Operates like the waiver of a customer charge. Greater percent discount thus to lower use customers.
California	Rate Design (1)	Medical Baseline	Inverted block rates under consideration by Commission - Assigned Commissioner has proposed moving to TOU rates, which would make baseline rates inapplicable. Consumer groups are fighting the proposed change. Recent statute continues bar on requiring residential TOU rates before 2018.
Colorado	State Energy Assistance	Low Income Energy Assistance Program (LEAP)	Commission on Low Income Energy Assistance coordinates state-funded efforts. The state and EOC maintain an 800 number, run by a contractor, to provide centralized information and referrals to those seeking help with energy costs.
Pennsylvania	Discount, DSM, credit and collection rules	Customer Assistance Programs (CAPs) Discount	From 2011 to 2012, there was a 6% decrease in residential electric terminations.
	Emergency Assistance	Customer Assistance and Referral Evaluation Services (CARES)	From 2011 to 2012, there was a 6% decrease in residential electric terminations.
Pennsylvania, PPL	Rate Assistance	PPL Electric Utilities On Track	In 2012, for example, CSRs made nearly 120,000 referrals to OnTrack administering organizations prompted by information provided by customers apply in person.
Seattle, Washington	Rate Assistance	Seattle Utility Discount Program	In 2014, mayor and city utilities began a multi-year effort to raise participation.

# APPENDIX C: COMMON CHARACTERISTICS OF LONG-TERM AFFORDABILITY PROGRAMS

Table C: Common Characteristics of Long-term Affordability Programs in the United States, Australia, and the United Kingdom

Overview	Jurisdiction		AU	CA	CO	ME	MD	MA	NJ	NV	NY	PA	OH	OR	WA	WI	UK	
	Reason/Mechanism for Establishing Program	Required by statute		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes
Programs before restructuring/statute			Yes	Yes	No	Yes	?	Yes	?	?	Yes	No	Yes	n/a	n/a	n/a	Yes	
Design & Administration	Utility and/or Program Administrator	All in state vs. by utility	All	All	By utility	All	All	All	All	All	All	All	By utility	By utility	All	All	All	
		Availability of utility by utility details	No	Yes	No	?	?	No	No	?	Yes	Yes	Yes	Yes	Yes	?	No	
	Intake process	Intake administrator (1)	Utility & Gov	Utility & CBOs	Utility	CBOs	CBOs	Utility & CBOs	CBOs	CBOs	Utility	Utility & CBOs	CBOs	Utility	Utility	Utility	Utility	
	Program Design	Uniform Design (2)	Both	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes
		Burden Based	No	No	Yes	Mixed	Yes	No	Yes	Yes	No	Yes	Yes	No	No	No	Yes	
Funding	Funding Source	Cost recovery	Taxes	Rates	Mixed	Rates	SBC	SBC	SBC	SBC	Rates	Rates	Rates	Rates	Rates	Mixed	Taxes	
		Customer classes	n/a	All	Res.	Retail	All	All	All	Retail	All	Mixed	All	Res.	Res.	All	n/a	
		Administrator	Govt	PUC	Utility	PUC	DOER	PUC	PUC	PUC	PUC	PUC	PUC	Utility	LIHEAP	PUC	Govt	
	How Funding Levels are Established	Open-ended funding (3)	No	Yes	Mixed	Varies	Set	Yes	Varies	Set	Set	Yes	Varies	Set	Set	Varies	No	
Other	Program Results/ Impacts	Low, medium or high benefit	?	High	?	?	Medium	High	High	?	Low	High	High	?	?	?	?	

Sources:

Adapted from chart "Legal and Regulatory Framework for Low Income Programs," in APPRISE, p. 56.

Notes:

- 1) CBOs are community based organizations; in most cases this is the same entity that takes federal LIHEAP applications; can be governments.
- 2) Uniform design refers to the high level characterization (i.e., PIPP, flat annual grant, % off monthly bill, etc.).
- 3) Where funding is open-ended, there is no limit on participation, but the PUC can adjust the program funding up or down over time.

# How High Are Household Energy Burdens?

An Assessment of National and Metropolitan Energy Burden across the United States

Ariel Dreihobl, Lauren Ross, and Roxana Ayala



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## ABOUT THE AUTHORS

**Ariel Drehobl** conducts research, analysis, and outreach on local-level energy efficiency policies and initiatives, with a focus on energy affordability, energy equity, and limited-income communities. Ariel earned a master of science in environmental science, policy, and management from a joint-degree program that awarded degrees from Central European University in Hungary, Lund University in Sweden, and the University of Manchester in the United Kingdom. She earned a bachelor of arts in history and international studies from Northwestern University.

**Lauren Ross** oversees ACEEE's work related to the local implementation of energy efficiency. Her research concentrates on the nexus of affordable housing, energy efficiency, and cities. She leads ACEEE's efforts to improve policies and expand utility programs to promote energy efficiency in low-income and multifamily households. Lauren earned a PhD in urban sociology from Temple University, a master of arts in urban sociology from the George Washington University, and a bachelor of arts in political science from the University of Delaware.

**Roxana Ayala** assists with research, writing, and technical support on local-level energy efficiency policies and initiatives, with a focus on energy equity. Roxana earned a bachelor of arts in environmental studies and urban studies from the University of California, Irvine.

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# Executive Summary



## KEY TAKEAWAYS

- New research based on data from 2017 finds that high energy burdens remain a persistent national challenge. Of all U.S. households, 25% (30.6 million) face a high energy burden (i.e., pay more than 6% of income on energy bills) and 13% (15.9 million) of U.S. households face a severe energy burden (i.e., pay more than 10% of income on energy).<sup>1</sup>
- Nationally, 67% (25.8 million) of low-income households ( $\leq$  200% of the federal poverty level [FPL]) face a high energy burden and 60% (15.4 million) of low-income households with a high energy burden face a severe energy burden.
- The East South Central Region (i.e., Alabama, Kentucky, Mississippi, and Tennessee) has the highest percentage of households with high energy burdens (38%) as compared to other regions.
- Black, Hispanic, Native American, and older adult households, as well as families residing in low-income multifamily housing, manufactured housing, and older buildings experience disproportionately high energy burdens nationally, regionally, and in metro areas.
- Weatherization can reduce low-income household energy burdens by about 25%, making it an effective strategy to reduce high energy burdens for households with high energy use while also benefiting the environment.
- Leading cities and states have begun to incorporate energy burden goals into strategies and plans and to create local policies and programs to achieve more equitable energy outcomes in their communities. They are pursuing these goals through increased investment in energy efficiency, weatherization, and renewable energy.

<sup>1</sup> Researchers estimate that housing costs should be no more than 30% of household income, and household energy costs should be no more than 20% of housing costs. This means that affordable household energy costs should be no more than 6% of total household income. For decades, researchers have used the thresholds of 6% as a high burden and 10% as a severe burden (APPRISE 2005). Note that high and severe energy burdens are not mutually exclusive. All severe energy burdens ( $> 10\%$ ) also fall into the high burden category ( $> 6\%$ ).

This report provides an updated snapshot of U.S. energy burdens (i.e., the percentage of household income spent on home energy bills) nationally, regionally, and in 25 select metro areas in the United States.<sup>1,2</sup> Both high and severe energy burdens are caused by physical, economic, social, and behavioral factors, and they impact physical and mental health, education, nutrition, job performance, and community development. Energy efficiency and weatherization can help address energy insecurity (i.e., the inability to adequately meet basic household heating, cooling, and energy needs over time) by improving building energy efficiency, reducing energy bills, and improving indoor air quality and comfort (Hernández 2016).

We recognize that the economic recession brought on by the global COVID-19 pandemic has greatly increased U.S. energy insecurity and also interrupted weatherization and energy efficiency programs nationally. While this report measures energy burdens using 2017 data from the American Housing Survey (AHS), we anticipate the recession will lead to a further increase in energy insecurity and higher energy burdens in 2020 and beyond.

## Methods

This study calculates energy burdens using the AHS, which includes a national and regional dataset as well as a dataset of 25 metropolitan statistical areas.<sup>4</sup> We calculate energy burdens across all households and in a variety of subgroups to identify those that spend disproportionately more of their income on energy bills than otherwise similar groups, analyzing across income, housing type, tenure status, race, ethnicity, and age of occupant and structure. We also calculate the percentage of households nationally, regionally, and in each select metro area that have high energy burdens (i.e., spend more than 6% of income on home energy bills) and severe energy burdens (i.e., spend more than 10% of income on home energy bills). We do not include households who do not directly pay for their energy bills.

## Energy Burden Findings

### NATIONAL ENERGY BURDENS

U.S. households spend an average of 3.1% of income on home energy bills. Figure ES1 presents our national energy burden findings by subgroup. We acknowledge

that many highly burdened groups are intersectional, meaning that they face compounding, intersecting causes of inequality and injustice, with energy burden representing one facet of inequity. The following are key national findings:

- Low-income households spend three times more of their income on energy costs compared to the median spending of non-low-income households (8.1% versus 2.3%).
- Low-income multifamily households spend 2.3 times more of their income on energy costs compared to the median spending of multifamily households (5.6% versus 2.4%).
- The median energy burden for Black households is 43% higher than for non-Hispanic white households (4.2% versus 2.9%), and the median energy burden for Hispanic households is 20% higher than that for non-Hispanic white households (3.5% versus 2.9%).
- The median renter energy burden is 13% higher than that of the median owner (3.4% versus 3.0%).
- More than 25% (30.6 million) of U.S. households experience a high energy burden, and about 50% (15.9 million) of households with a high energy burden face a severe energy burden.<sup>5</sup>
- Of low-income households ( $\leq$  200% FPL), 67% (25.8 million) experience a high energy burden, and 60% (15.4 million) of those households with a high energy burden face a severe energy burden.
- Low-income households, Black, Hispanic, Native American, renters, and older adult households all have disproportionately higher energy burdens than the national median household.

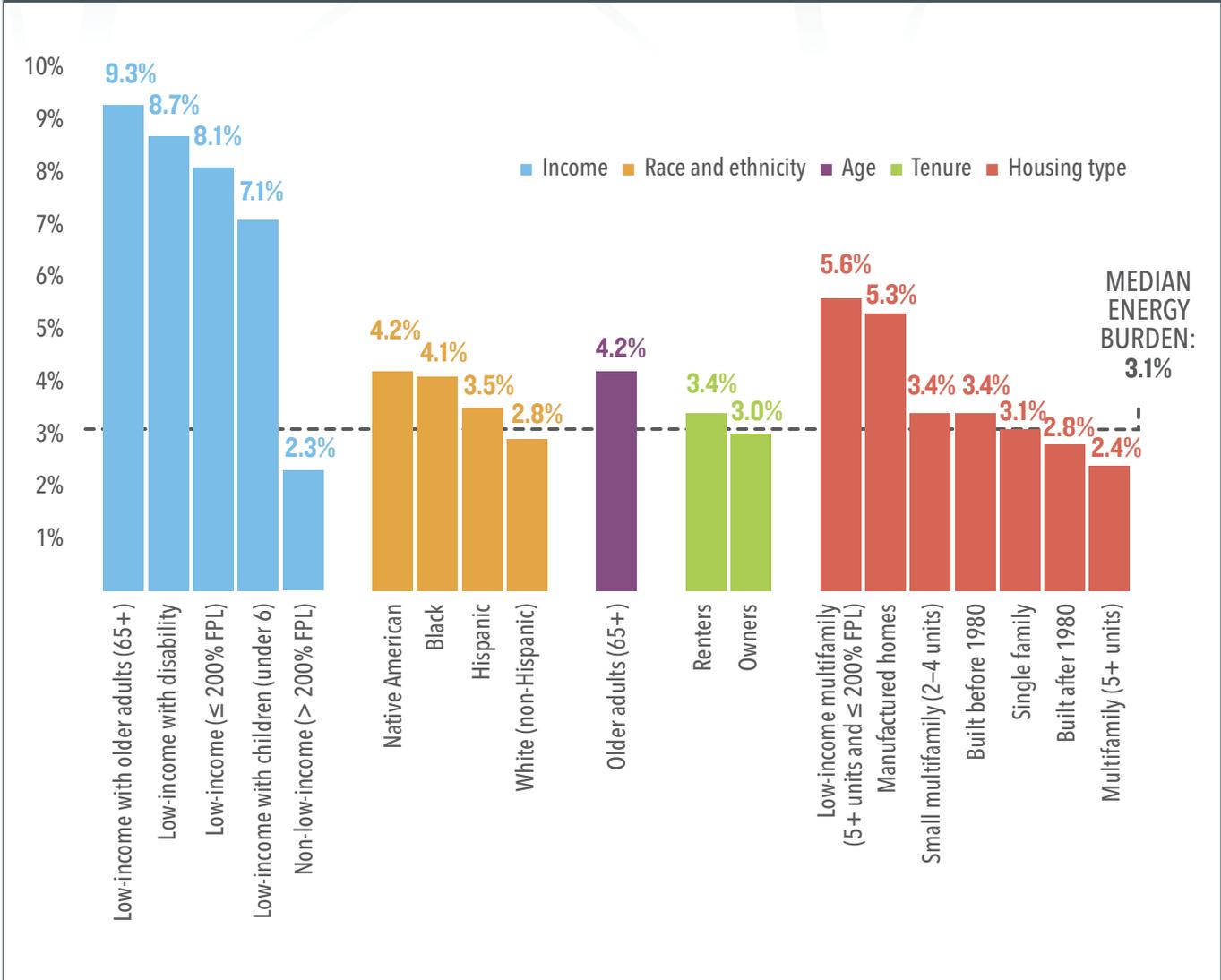
<sup>2</sup> This study focuses on home energy burden and includes electricity and heating fuels. Note that the study does not include transportation, water, or telecommunication cost burdens in its energy burden calculations.

<sup>3</sup> This report provides an update to ACEEE's previous energy burden research. Dreihobl and Ross (2016) analyzed 2011 and 2013 American Housing Survey (AHS) data, and Ross, Dreihobl, and Stickle (2018) analyzed 2015 AHS data. This report analyzes 2017 AHS data, the most recent data available as of publication.

<sup>4</sup> We include the 25 metropolitan statistical areas (MSAs) sampled for the 2017 AHS: Atlanta, Baltimore, Birmingham, Boston, Chicago, Dallas, Detroit, Houston, Las Vegas, Los Angeles, Miami, Minneapolis, New York City, Oklahoma City, Philadelphia, Phoenix, Richmond, Riverside, Rochester, San Antonio, San Francisco, San Jose, Seattle, Tampa, and Washington, DC.

<sup>5</sup> Note that high and severe energy burdens are not mutually exclusive. All severe energy burdens ( $>$  10%) also fall into the high burden category ( $>$  6%).

**FIGURE ES1. National energy burdens across subgroups (i.e., income, race and ethnicity, age, tenure, and housing type) compared to the national median energy burden**



## REGIONAL ENERGY BURDENS

We find that the national trends hold true across the nine census regions. The following are our key regional findings:

- Across all nine regions, low-income household energy burdens are 2.1-3 times higher than the median energy burden.
- The East South Central region (i.e., *Alabama, Kentucky, Mississippi, Tennessee*) has the greatest percentage of households (38%) with high energy burdens, followed by East North Central (i.e., *Illinois, Indiana, Michigan, Ohio, Wisconsin*), New England (*Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont*), and Middle Atlantic regions (i.e., *New Jersey, New York, Pennsylvania*) (all 29%).
- The gap between low-income and median energy burdens is largest in the New England, Pacific (i.e., *Alaska, California, Hawaii, Oregon, Washington*), and Middle Atlantic regions.
- The South Atlantic region (i.e., *Delaware, DC, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia*) had the greatest number of households (6.3 million) with high burdens, followed by the East North Central (5.4 million) and Middle Atlantic (4.6 million) regions.

## METRO AREA ENERGY BURDENS

National and regional patterns are mirrored in cities. The following are our key metropolitan area findings:

- Low-income households experience energy burdens at least two times higher than that of the average household in each metropolitan area included in the study.<sup>6</sup>
- Black and Hispanic households experience higher energy burdens than non-Hispanic white households; renters experience higher energy burdens than owners; and people living in buildings built before 1980 experience higher energy burdens than people living in buildings built after 1980 across all metro areas in the study.
- Six metro areas have a greater percentage of households with a high energy burden than the national average (25%), including Birmingham (34%), Detroit (30%), Riverside (29%), Rochester (29%), Atlanta (28%), and Philadelphia (26%).

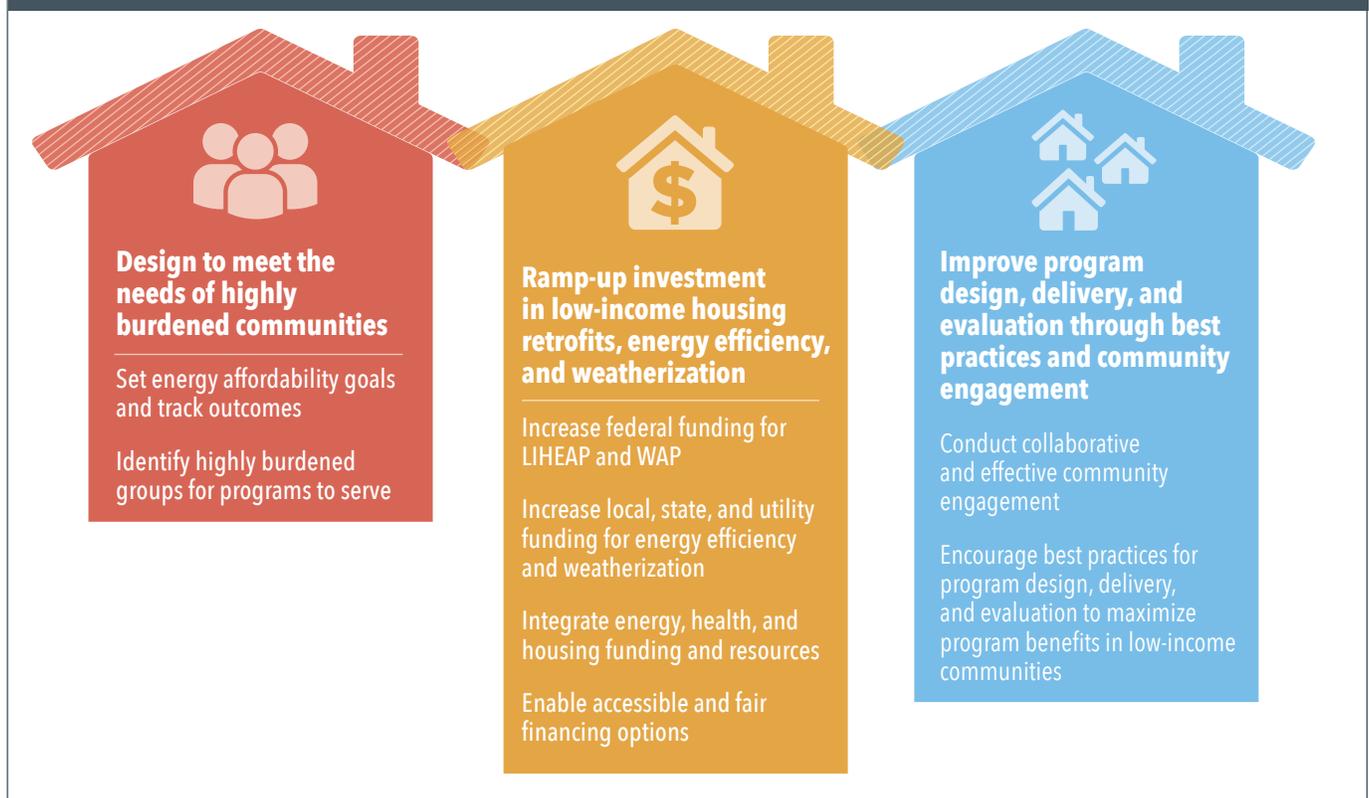
- In five metro areas—Baltimore, Philadelphia, Detroit, Boston, and Birmingham—at least one-quarter of low-income households have energy burdens above 18%, which is three times the high energy burden threshold of 6%.

See the body of the report for additional images, maps, charts, and data on energy burden calculations nationally, regionally, and in metro areas.

## Strategies to Accelerate, Improve, and Better Target Low-Income Housing Retrofits and Weatherization

Clean energy investments—such as energy efficiency, weatherization, and renewable energy—can provide a long-term, high-impact solution to lowering high energy burdens. By investing in energy efficiency and weatherization first or alongside renewable energy technologies, these measures can reduce whole-home energy use to maximize the costs and benefits of

**FIGURE ES2. Strategies to improve and expand low-income energy efficiency and weatherization programs**



<sup>6</sup> We define the “average household” energy burden as the median across all households in the sample (i.e., in each MSA).

**Based on prior evidence of how weatherization reduces average customer bills, we estimate that it can reduce low-income household energy burden by 25%.**

additional renewable energy generation. This report focuses on weatherization and energy efficiency as long-term solutions to reducing high energy burdens; these solutions can be combined with renewable energy investments and/or electrification strategies that reduce energy bills for additional impact. Based on prior evidence of how weatherization reduces average customer bills, we estimate that it can reduce low-income household energy burden by 25%.<sup>7</sup>

To ensure that more low-income and highly energy burdened households receive much-needed energy efficiency and weatherization investments, we recommend that policymakers and program implementers design policies and programs to meet the needs of highly burdened communities and set up processes for evaluation and accountability processes. This involves engaging with community members from the start, increasing funding for low-income weatherization and energy efficiency, and integrating best practices into program design and implementation. Figure ES2 depicts this actionable framework. For more information about these strategies, see the full report.

## Conclusions and Next Steps

Energy affordability remains a national crisis, with low-income households, communities of color, renters, and older adults experiencing disproportionately higher energy burdens than the average household nationally, regionally, and in metro areas. This study finds that each MSA has both similar and unique energy affordability inequities. Further research can help better understand the intersectional drivers of high energy burdens and the policies best suited to improve local energy affordability. Climate change and the global pandemic also underscore the urgency in addressing high household energy burdens. As temperatures continue to rise and heat waves become more common, access to clean, affordable energy is needed more than ever to prevent indoor heat-related illnesses and deaths.

Cities, states, and utilities are well positioned to build on this research and conduct more targeted and detailed energy burden analyses, such as the Pennsylvania Public Utility Commission's study on home energy affordability for low-income customers. Studying energy burden and more broadly analyzing energy insecurity factors are first steps toward setting more targeted energy burden reduction goals and creating policies and programs that lead to more vibrant and prosperous communities.

<sup>7</sup> We assume 25% savings from energy efficiency upgrades based on the U.S. Department of Energy's estimate (DOE 2014) and use the median low-income household values to calculate a 25% reduction. We reduced the median low-income energy bill by 25% from \$1,464 to \$1,098. Using the median low-income household income of \$18,000, this equates to a reduced energy burden of 6.1%. Reducing the median low-income energy burden from 8.1% to 6.1% is a 25% reduction.

# Introduction



Energy insecurity—that is, the inability to adequately meet basic household heating, cooling, and energy needs over time (Hernández 2016)—is increasingly viewed as a major equity issue by policymakers, energy utilities, and clean energy and environmental justice advocates. This multidimensional problem reflects the confluence of three factors: inefficient housing and appliances, lack of access to economic resources, and coping strategies that may lead some residents to dangerously under-heat or under-cool their homes (Hernández, Aratani, and Jiang 2014).

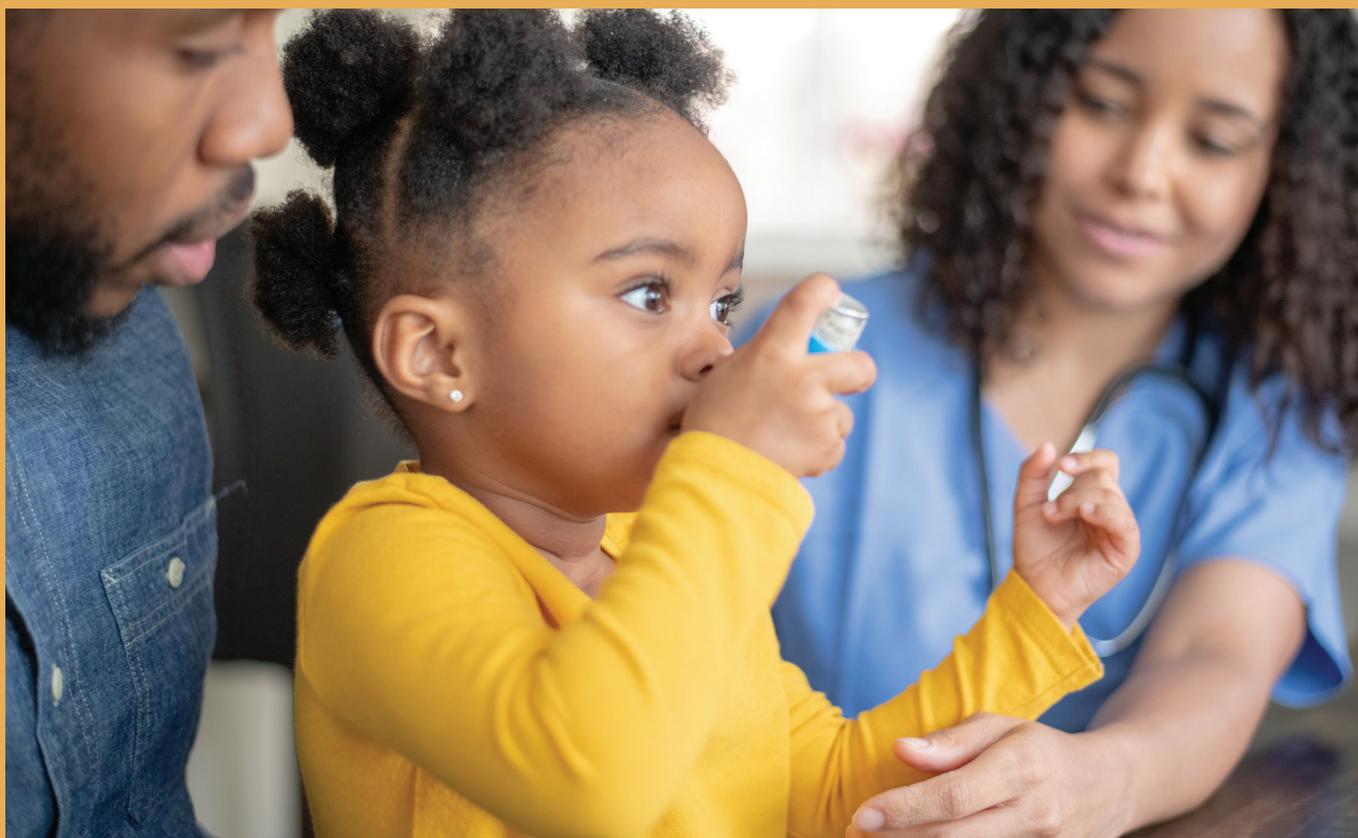
Household energy burden—the percentage of annual household income spent on annual energy bills—is one key element contributing to a household’s energy insecurity. Energy burden as a metric helps us visualize energy affordability (i.e., the ability to afford one’s energy bills); identify which groups shoulder disproportionately higher burdens than others; and recognize which groups most need targeted energy-affordability- and energy-justice-related policies and investments to reduce high energy burdens. Three strategies can reduce both energy insecurity and high energy burdens: increasing household income, increasing bill payment assistance through government or utility resources, and reducing household energy use. This study discusses policy considerations that focus on the third solution of reducing excess energy use to lower high household energy burdens.

This report provides a snapshot of energy burdens nationally and in 25 of the largest U.S. metro areas. We examine median household energy burdens among

groups—varying by income, housing type and age, and tenure status—as well as the percentage of households experiencing high (> 6%) and severe (> 10%) energy burdens nationally, in metro areas, and across groups (APPRISE 2005). Building on ACEEE’s 2016 urban energy burden study and 2018 rural energy burden study (Drehobl and Ross 2016; Ross, Drehobl, and Stickles 2018), this report analyzes national-, regional-, and metro-level data from the U.S. Census Bureau’s most recent American Housing Survey (AHS) conducted in 2017.

Local policymakers, utilities, and advocates can use this report’s data and policy recommendations to better understand both which groups tend to have disproportionately higher energy burdens and how they can measure these burdens in their communities. The subsequent policy recommendations focus on low-income energy efficiency and weatherization as high-impact strategies to alleviate high energy burdens and improve overall energy affordability.

# Background



## Systemic Patterns and Causes of Inequities

Household access to energy is central to maintaining health and well-being, yet one in three U.S. households reported difficulty paying their energy bills in 2015 (EIA 2018). Black, Indigenous, and People of Color (BIPOC) communities often experience the highest energy burdens when compared to more affluent or white households (Kontokosta, Reina, and Bonczak 2019; Drehobl and Ross 2016; Hernández et al. 2016).<sup>8</sup> These communities often experience racial segregation, high unemployment, high poverty rates, poor housing conditions, high rates of certain health conditions, lower educational opportunity, and barriers to accessing financing and investment (Jargowsky 2015; Cashin 2005). Many of these characteristics are due in part to systemic racial discrimination, which has led to long-standing patterns of disenfranchisement from income and wealth-building opportunities for BIPOC communities as compared to white communities (Rothstein 2017).

<sup>8</sup> We use the term BIPOC in this report to describe communities that experience especially acute systemic inequities, barriers, and limited access to energy programs. By specifically naming Black and Indigenous (Native American) communities, the term BIPOC recognizes that Black and Indigenous people have historically experienced targeted policies of systemic economic exclusion, classism, and racism in the United States. It is important to recognize this history and how it has led to disproportionately high energy burdens and unique barriers to accessing clean energy technologies and investments.

Policies and practices that have led to economic and/or social exclusion in BIPOC communities include neighborhood segregation and redlining, lack of access to mortgages and other loans, mass incarceration, employment discrimination, and the legacy of segregated and underfunded schools (Jargowsky 2015; McCarty, Perl, and Jones 2019).<sup>9</sup> These types of systemic exclusions, underinvestments, discriminative lending practices, and limited housing choices have also limited BIPOC communities' access to efficient and healthy housing (Lewis, Hernández, and Geronimus 2019). In addition, Black communities are 68% more likely to live within 30 miles of a coal-fired power plant, and properties in close proximity to toxic facilities average 15% lower property values than those in other areas (National Research Council 2010). Black children are three times as likely to be admitted to the hospital for asthma attacks than white children (Patterson et al. 2014). According to a study by the American Association of Blacks in Energy, while Black households spent \$41 billion on energy in 2009, they held only 1.1% of energy jobs and gained only 0.01% of the revenue from energy-sector profits (Patterson et al. 2014).

## Limited Access to Energy Programs

A growing body of research shows that BIPOC and low-income communities experience disparate access to residential energy-saving appliances and other energy efficiency upgrades. While low-income and communities of color on average consume less energy than wealthier households, they are more likely to live in less-efficient housing (Bednar, Reames, and Keoleian 2017). Researchers found that, when holding income constant, BIPOC households experience higher energy burdens than non-Hispanic white households (Kontokosta, Reina, and Bonczak 2019). BIPOC and low-income communities also may experience higher costs when investing in energy-efficient upgrades. For example, a study based in Detroit found that energy-efficient lightbulbs were less available in high-poverty areas and smaller stores, and when they were available, they were more expensive than in other areas (Reames, Reiner, and Stacey 2018).

Others have found that untargeted utility-administered energy efficiency programs do not effectively reach BIPOC and low-income communities—particularly those living in multifamily buildings (Frank and Nowak 2016; Samarripas and York 2019). Low-income communities face economic, social, health and safety, and information barriers that impact their ability to access programs, and many programs fail to address these barriers through specific targeting practices. Limited access to energy

**Systemic exclusions, under-investments, discriminative lending practices, and limited housing choices have limited Black, Indigenous, and People of Color communities' access to efficient and healthy housing.**

efficiency resources and investments coupled with lower incomes increase the proportion of income that low-income and BIPOC households spend on energy bills (Jessel, Sawyer, and Hernández 2019; Berry, Hronis, and Woodward 2018).

Where utilities do administer programs targeted at low-income customers, participant needs far exceed available resources. Reames, Stacy, and Zimmerman (2019) found that 11 large investor-owned utilities across six states have distributional disparities in low-income investments; that is, they do not spend energy efficiency dollars proportionally on programs designed to reach low-income populations. A 2018 report found that only 6% of all U.S. energy efficiency spending in 2015 was dedicated to low-income programs (EDF APPRISE 2018). Most states require that utility energy efficiency program portfolios be cost effective, often using tests that focus mostly on direct economic costs to the utility (Woolf et al. 2017; Hayes, Kubes, and Gerbode 2020). This requirement places an additional burden on utilities, states, and local governments that invest in programs that serve low-income communities because it does not account for nonenergy and additional health, economic, and community benefits in program planning and evaluations.

## Definition and Drivers of High Energy Burdens

*High energy burdens* are often defined as greater than 6% of income, while *severe energy burdens* are those greater than 10% of income (APPRISE 2005).<sup>10</sup> Past research found that low-income, Black, and Hispanic communities, as well as older adults, renters, and those residing in low-income multifamily buildings experienced disproportionately higher energy burdens than other households (Drehobl and Ross 2016; Ross, Drehobl, and Stickles 2018).

<sup>9</sup> *Redlining* is the discriminatory practice of fencing off areas in which banks would avoid investments based on community demographics. Redlining was included in local, state, and federal housing policies for much of the 20th century. For more information on historical forms of economic and social exclusion, see *The Color of Law: A Forgotten History of How Our Government Segregated America* by Richard Rothstein.

<sup>10</sup> Researchers estimate that housing costs should be no more than 30% of household income, and household energy costs should be no more than 20% of housing costs. This means that affordable household energy costs should be no more than 6% of total household income.

**TABLE 1. Key drivers of high household energy burdens**

<b>Drivers</b>	<b>Examples of factors that affect energy burden</b>
<b>Physical</b>	Housing age (i.e., older homes are often less energy efficient)
	Housing type (e.g., manufactured homes, single family, and multifamily)
	Heating and cooling system (e.g., system type, fuel type, and fuel cost)
	Building envelope (e.g., poor insulation, leaky roofs, inefficient and/or poorly maintained poorly maintained heating and cooling systems (HVAC), and/or inadequate air sealing)
	Appliances and lighting efficiency (e.g., large-scale appliances such as refrigerators, washing machines, and dishwashers)
	Topography and location (e.g., climate, urban heat islands)
	Climate change and weather extremes that raise the need for heating and cooling
<b>Socioeconomic</b>	Chronic economic hardship due to persistent low income
	Sudden economic hardship (e.g., severe illness, unemployment, or disaster event)
	Inability to afford (or difficulty affording) up-front costs of energy efficiency investments
	Difficulty qualifying for credit or financing options to make efficiency investments due to financial and other systemic barriers
	Systemic inequalities relating to race and/or ethnicity, income, disability, and other factors
<b>Behavioral</b>	Information barriers relating to available bill assistance and energy efficiency programs and relating to knowledge of energy conservation measures
	Lack of trust and/or uncertainty about investments and/or savings
	Lack of cultural competence in outreach and education programs
	Increased energy use due to occupant age, number of people in the household, health-related needs, or disability
<b>Policy-related</b>	Insufficient or inaccessible policies and programs for bill assistance, energy efficiency, and weatherization for low-income households
	Utility rate design practices, such as high customer fixed charges, that limit customers' ability to respond to high bills through energy efficiency or conservation

Source: Updated from Ross, Drehobl, and Stickles 2018

Drivers of high household energy burdens are often the result of the systemic factors, barriers, and challenges that these households face. Previous research identified drivers that can raise energy burdens, including the dwelling's physical structure, the resident's socioeconomic status and behavioral patterns, and the availability of policy-related resources (Drehobl and Ross 2016; Ross, Drehobl, and Stickles 2018). Table 1 shows an updated list of key drivers of high energy burdens.

### **ENERGY INEFFICIENCY AS A DRIVER OF HIGH ENERGY BURDENS**

While low incomes are a substantial factor driving higher energy burdens, inefficient housing is also a

contributor. According to the 2017 AHS data, 9% of total U.S. households completed an energy-efficient improvement in the past two years, but only 17% were low-income households (Census Bureau 2019). Low-income households ( $\leq 200\%$  of the federal poverty level [FPL]) make up about 30% of the population, which means that they are underrepresented in households completing energy efficiency upgrades and thus are not proportionally accessing and benefiting from these investments.

Additional research examining energy benchmarking data in a few major cities has found that households from both the lowest- and highest-income brackets had the highest *energy use intensity* (EUI)—that is, they had

the highest energy consumption per square foot. While consumption behaviors are regarded as the driver for high EUI among higher-income households, the researchers point to inefficient heating and lighting infrastructure to help explain the high EUI among low-income households (Kontokosta, Reina, and Bonczak 2019). High-income households use large amounts of energy to power larger homes—as well as more electronics and devices that use large amounts of energy—while low-income households tend to use fewer, less-efficient devices that require relatively large amounts of energy due to the inefficiency of the dwelling or the appliance itself. Therefore, household inefficiencies rather than inefficient behaviors tend to lead to higher energy use and expenditures for low-income households. Generally, energy efficiency investments can allow households to engage in the same activity while using less energy, thus reducing high energy burdens and improving comfort, health, and safety.

## Adverse Effects of High Energy Burdens

Our comprehensive evaluation of energy burden research reveals both that low-income households spend, on average, a higher portion of their income on energy bills than other groups, and that energy burdens are also higher for communities of color, rural communities, families with children, and older adults (Brown et al. 2020; Lewis, Hernández, and Geronimus 2019; Reames 2016; Hernández et al. 2016; Drehobl and Ross 2016; Ross, Drehobl, and Stickles 2018). Energy burden is one indicator to measure energy insecurity, and high energy burdens are associated with inadequate housing conditions and have been found to affect physical and mental health, nutrition, and local economic development.

### EXCESSIVE ENERGY COST CAN IMPACT RESIDENTS' HEALTH AND COMFORT.

Researchers have found that many households with high energy burdens also live in older, inefficient, and unhealthy housing. Inefficient housing is associated with other health impacts, such as carbon monoxide poisoning, lead exposure, thermal discomfort, and respiratory problems such as asthma and chronic obstructive pulmonary disease (COPD); it is also associated with the potential for hypothermia and/or heat stress resulting from leaky and/or unrepaired heating and cooling equipment (Brown et al. 2020; Norton, Brown, and Malomo-Paris 2017).

Households experiencing energy insecurity may forego needed energy use to reduce energy bills, forcing them to live in uncomfortable and unsafe homes. Hernández, Phillips, and Siegel (2016) found that half of the study's participants who experienced high monthly utility bills engaged in coping strategies such as using secondary heating equipment (i.e., stoves, ovens, or space heaters) to compensate for inefficient or inadequate heating systems. Employing this coping measure can compromise resident safety and comfort, and it may increase exposure to toxic gases. Teller-Elsberg et al. (2015) found that excess winter deaths potentially caused by fuel poverty kill more Vermonters each year than car crashes. In addition, according to the Residential Energy Consumption Survey, one in five U.S. households reported reducing or forgoing necessities such as food or medicine to pay an energy bill (EIA 2018). These tradeoffs can impact long-term health and well-being.

Climate change, rising temperatures, and subsequent cooling demands will continue to exacerbate household energy burdens—and prove deadly for some. In Maricopa County, Arizona—one of the hottest regions in the southwest—more than 90% of residents have access to a cooling system, yet up to 40% of heat-related deaths occur indoors (Maricopa County Department of Public Health 2020). A recent survey of homebound individuals found that one-third faced limitations on home cooling system use, with the overwhelming majority (81%) citing the “cost of bills” as a contributing factor (Maricopa County Department of Public Health 2016). As residents are increasingly forced to weigh the cost of properly cooling their homes, high energy burdens will likely become an even greater public health priority in the years to come.

### HIGH ENERGY BURDENS IMPACT MENTAL HEALTH OF RESIDENTS.

High energy burdens can have mental health impacts—such as chronic stress, anxiety, and depression—associated with fear and uncertainty around access to energy, the complexities of navigating energy assistance programs, and the inability to control energy costs (Hernández, Phillip, and Siegel 2016). In addition, Hernández (2016) found that low-income residents who were experiencing energy insecurity worried about losing their parental rights as they struggled to maintain essential energy services, such as lighting, in their homes.

## **HIGH ENERGY BURDENS CAN LIMIT INDIVIDUALS' ABILITY TO BENEFIT FROM ECONOMIC DEVELOPMENT IN THEIR COMMUNITIES.**

Households with high energy burdens are more likely to stay caught in cycles of poverty. After controlling for common predictors of poverty status such as income loss, illness, health, marital status, education, health insurance, and head of households—Bohr and McCreery (2019) found that, on average, energy-burdened households have a 175–200% chance of remaining in poverty for a longer period of time compared to nonenergy-burdened households.<sup>11</sup> BIPOC communities, older adults, and low-income households often experience this pernicious cycle, which includes persistent income inequality along with limited funding to invest in education or job training, and high energy burdens can perpetuate this cycle (Bohr and McCreery 2019; Lewis, Hernández, and Geronimus 2019).

### **Impact of COVID-19 on Energy Insecurity**

As the world enters a global recession in the wake of the coronavirus pandemic, more households—especially in BIPOC communities—may have difficulty paying their energy bills due to massive job losses; reduced income; a warming climate; and higher energy bills resulting from more time at home due to stay-at-home orders and to students and adults learning and working from home, respectively. For example, in March and April 2020, the California Public Utility Commission stated that residential electricity usage increased by 15–20% compared to the previous year (CPUC 2020). Because such factors lead to higher home energy bills, energy burdens will increase for households across the United States.

**Households with high energy burdens are more likely to stay caught in cycles of poverty.**

COVID-19 disproportionately impacts BIPOC communities due to many of the policies that have led to systemic economic and social exclusion. These policies have led to BIPOC communities experiencing higher rates of underlying health conditions, a lack of health insurance or access to testing, and a higher likelihood of working in the service industry or in other essential worker roles that do not allow for teleworking (SAMHSA 2020; CDC 2020). COVID-19 has also impacted the ability of energy efficiency and weatherization programs to operate, and limited the mix of measures that can be installed; many energy efficiency and weatherization programs have slowed down or are on hold (Ferris 2020). Policies and programs that address energy insecurity are even more important now in the face of rising energy bills and burdens.

Given these factors, energy burdens in 2020 are likely to be much higher than the burdens we calculate in this report, which uses 2017 data. The economic situation has clearly shifted drastically since 2017. While we expect post-2020 burden trends to be similar, yet more acute, we cannot visualize the full extent of current and future energy burdens until the release of post-2020 data in the 2023 AHS, which will include data from 2021.

<sup>11</sup> This study does not examine the relationship between energy burden and rent burden (i.e., the percentage of income spent on housing costs). Studies have found that rent burdens are also increasing, especially for communities of color, older adults, and families (Currier et al. 2018).

# Methods



This analysis builds on the methods used in ACEEE’s previous two energy burden studies, *Lifting the High Energy Burden in American’s Largest Cities* (Drehobl and Ross 2016) and *The High Cost of Energy in Rural America* (Ross, Drehobl, and Stickles 2018). This new study analyzes 2017 data from AHS, which is issued by the U.S. Department of Housing and Urban Development (HUD). The AHS is a biennial household-level survey by the Census Bureau that collects wide-range housing and demographic data from a nationally and regionally representative cross section of households across the United States and in a subset of metropolitan statistical areas (MSAs). The AHS includes household-level income data and energy cost data that we use as the basis of our energy burden calculations. The AHS models its energy cost data based on household characteristics ascertained through its survey and also uses data collected through the Residential Energy Consumption Survey (RECS) for a different national set of households.<sup>12</sup>

As we noted earlier, we define households with high energy burdens as those spending more than 6% of their income on electricity and heating fuel costs, and households with severe energy burdens as those

spending more than 10% of their income on energy costs.<sup>13</sup> These two categories are not mutually exclusive; *severe burden* is a worse-off subset of high burden households.

<sup>12</sup> Beginning with the 2015 edition, the AHS stopped including questions on energy costs. Previously, the majority of these data was self-reported. As part of the 2015 AHS redesign, researchers began estimating energy costs through regression-model-based imputation. They created the utility estimation system (UES) to estimate annual energy costs using regression models developed from the RECS, which collects administrative data from suppliers on actual billing amounts. This estimate was divided by 12 to calculate average monthly energy costs. The RECS also collects some housing characteristics similar to those the AHS collects, which allows the construction of models that can then be applied to the AHS. For more on the energy cost estimation model development and decisions for the 2015 AHS, see [www.huduser.gov/portal/sites/default/files/pdf/American-Housing-Survey.pdf](http://www.huduser.gov/portal/sites/default/files/pdf/American-Housing-Survey.pdf).

<sup>13</sup> HUD determines affordable housing costs to be 30% of total household income. Researchers have determined that, typically, 20% of total housing expenses are energy costs. This equates to 6% of total income spent on energy bills as an affordable level (Fisher Sheehan & Colton 2020). We consider energy burdens above 6% to be high burdens, with burdens above 10% to be severe. This method is in line with other research (APPRISE 2005).

The following are our study's inclusion and exclusion criteria:

- *Electricity and heating fuels.* The study does not include water, transportation, telecommunications, or Internet costs. Although such costs can create additional monetary burdens for households, we include only electricity and heating fuel costs in our energy burden calculations.
- *Households must report household income and the amount they pay for their electricity and their main heating fuel.*<sup>14</sup> If households did not include all three factors, we did not include them in our analysis.

We examine energy burdens for a variety of household subsets at the national, regional, and metropolitan levels, including the following:

- *Income level.* All households that fall into low-income ( $\leq 200\%$  FPL) and non-low-income ( $> 200\%$  FPL) categories.<sup>15</sup>
- *Low-income households with vulnerable persons at home.* Low-income households with a household member over the age of 65, under the age of 6, or who has a disability.
- *Housing type and age.* Single-family, small multifamily (two to four units), large multifamily (five or more units), low-income multifamily (five or more units and  $\leq 200\%$  FPL), manufactured housing, buildings built before 1980, and buildings built after 1980.<sup>16</sup>
- *Tenure:* Renters and owners.
- *Race and ethnicity.* Black, Hispanic, and non-Hispanic white households. We also include Native American households in the national analysis.
- *Age.* Households with one or more adults over the age of 65.

## Limitations

We included 48 MSAs in our last urban energy burden report, which used both 2011 and 2013 AHS data. This report uses only 2017 data, which limits our sample to 25 MSAs (AHS 2019). AHS includes modeled energy costs, which are determined by matching characteristics of households in the AHS to characteristics of households in the RECS. We also exclude households that do not report income, do not have a heating source, or do not pay for their heating costs. Thus, our report findings do not include data on renters who pay for their heating and/or electricity in their rent, or households with no annual income reported.

Our study does not explore causality, so we cannot determine *why* energy burdens differ across metro areas and demographic and other groups. Additional research is needed to determine the causes of disproportionate energy burdens, which can include building efficiency, income and poverty rates, and other timely economic factors. We are unable to compare trends across our energy burden reports, as this study does not explore *why* and *how* energy burdens may have changed over time.

Finally, our study includes only the 25 metro areas sampled by the AHS, which are not necessarily the best or worst performing metro areas regarding energy burdens. Ranking metro areas is thus limited since this is only a partial sample of cities. ACEEE plans to update this research with additional metro areas as more AHS data are available in the fall of 2020.

The following are the 25 MSAs with representative samples in the 2017 AHS dataset:

1. Atlanta	6. Dallas	11. Miami	16. Phoenix	21. San Francisco
2. Baltimore	7. Detroit	12. Minneapolis	17. Richmond	22. San Jose
3. Birmingham	8. Houston	13. New York City	18. Riverside	23. Seattle
4. Boston	9. Las Vegas	14. Oklahoma City	19. Rochester	24. Tampa
5. Chicago	10. Los Angeles	15. Philadelphia	20. San Antonio	25. Washington, DC

<sup>14</sup> AHS calculates household income as total money before taxes and other payments, including Social Security income, cash public assistance, or welfare payments from the state or local welfare office, retirement, survivor or disability benefits, and other sources of income such as veterans' payments, unemployment and/or worker's compensation, child support, and alimony. For more information, see: [www2.census.gov/programs-surveys/ahs/2017/2017%20AHS%20Definitions.pdf](http://www2.census.gov/programs-surveys/ahs/2017/2017%20AHS%20Definitions.pdf).

<sup>15</sup> In ACEEE's 2016 urban energy burden report, we defined low-income as 80% of the area median income (AMI), while this report defines low-income as 200% FPL. We made this change due to data availability. The 200% FPL definition also lines up with the Weatherization Assistance Program and is the most common qualification criterion for utility-led low-income programs. Because of this, low-income data in the 2016 and 2020 reports do not use the same definitions and are therefore not directly comparable.

<sup>16</sup> We chose 1980 as our cutoff point as states and cities began adopting the first building energy codes in the late 1970s and early 1980s. At this time, builders around the country began to consider energy and minimal energy efficiency measures due to increasing awareness of efficiency measures and concerns about energy as a result of the energy-related economic shocks of the 1970s.

# Energy Burden Findings



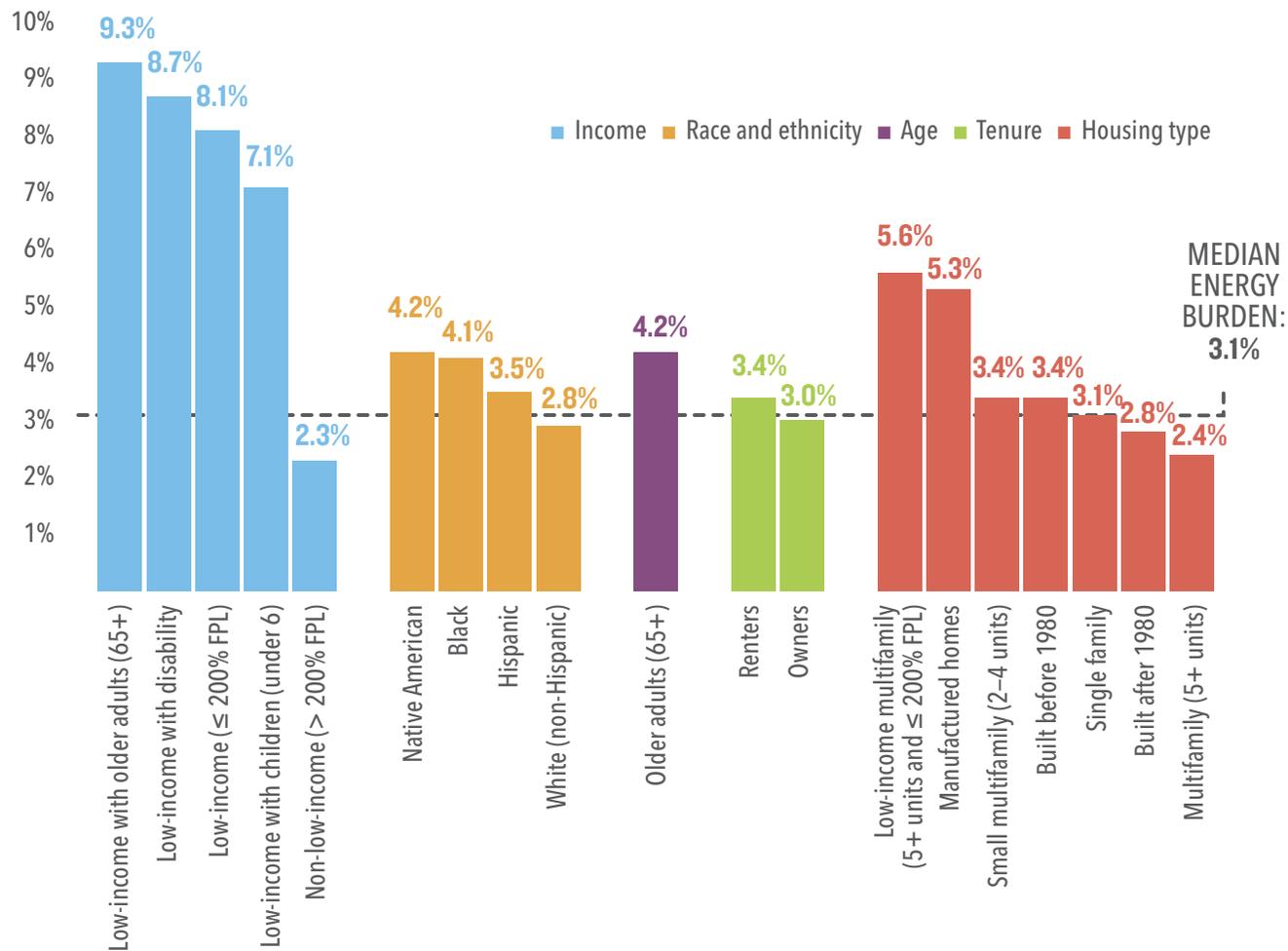
The results of this energy burden analysis reflect previous ACEEE studies in finding that nationally, regionally, and across all 25 metro areas, particular groups experience disproportionately high energy burdens. See **Appendices A** and **B** for tables including national, regional, and metro energy burden data.

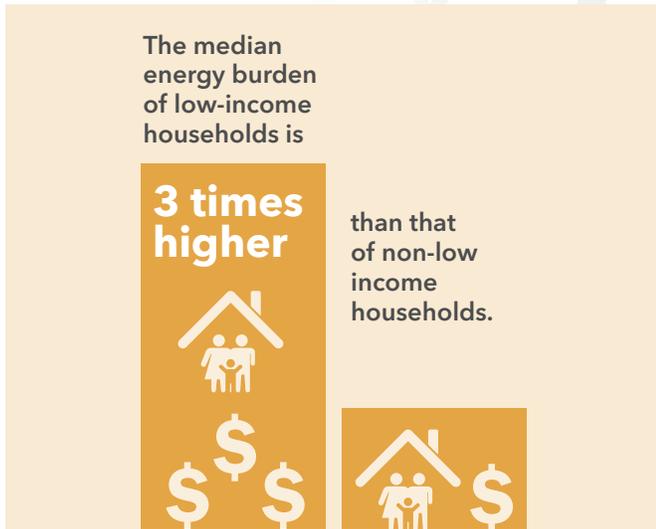
## National Energy Burdens

Across the nationally representative sample, we find that low-income, Black, Hispanic, renter, and older adult households have disproportionately higher energy burdens than the average household. Figure 1 shows the median energy burden for different groups nationally,

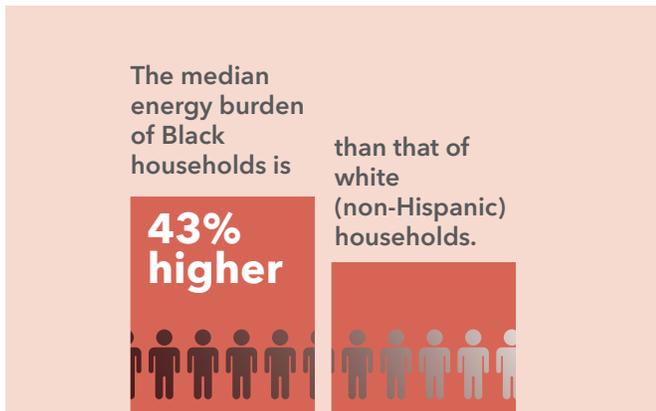
across categories of income, race and ethnicity, age, tenure status, and housing type. We find that the median national energy burden is 3.1%, and that the median low-income ( $\leq 200\%$  FPL) household energy burden is 3.5 times higher than the non-low-income household energy burden (8.1% versus 2.3%).

**FIGURE 1. National energy burdens across subgroups (i.e., income, race and ethnicity, age, tenure, and housing type) compared to the national median energy burden**

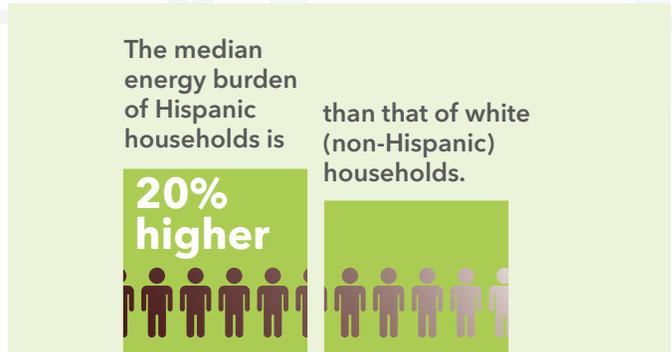




Many groups experience disproportionately high energy burdens, with low-income households having the highest energy burdens. These households have limited discretionary income and often have older, less-efficient housing stock and appliances that lead to higher energy bills. Even for cases in which monthly energy costs are similar between low-income and non-low-income households, the former devote a greater proportion of their income to these costs. Given this, reducing excess energy use in low-income households is critical for addressing energy insecurity.



We also recognize that many highly burdened groups are intersectional—that is, they face compounding, intersecting causes of inequality and injustice. For example, nearly half of the older adult population in general is economically vulnerable, as are the majority of older Black and Hispanic households (Cooper and Gould 2013). Policies and programs that focus on addressing low-income household energy burdens will likely intersect with other highly burdened groups. Further research can help identify how high energy burdens are impacted by differences in race, ethnicity, income, education, housing type, occupant age, and other factors.



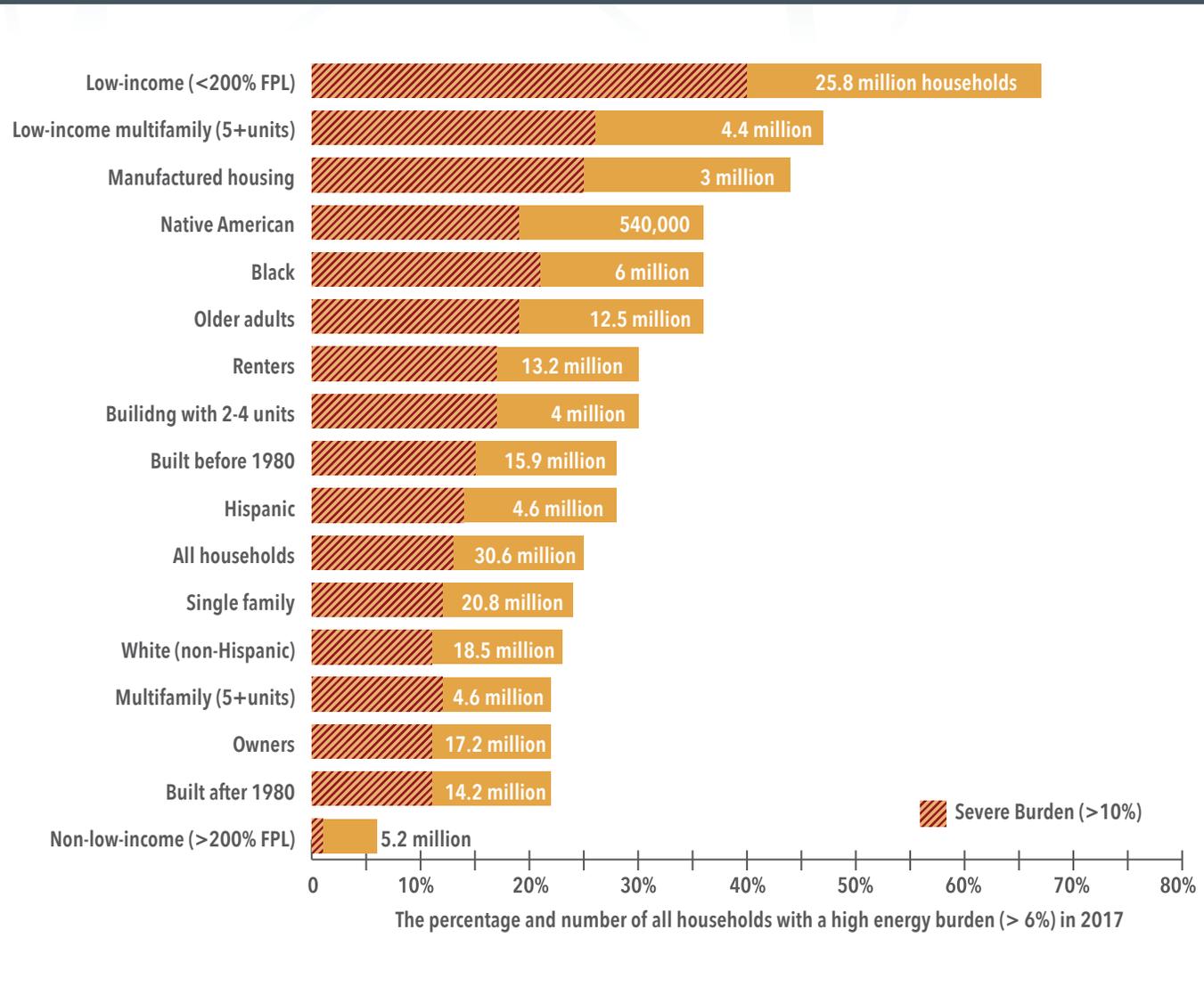
## NATIONAL DATA: HIGH AND SEVERE ENERGY BURDENS

Median energy burdens allow us to compare burdens between groups, yet they do not illustrate how many people experience the impacts of energy insecurity, or the degrees to which they experience it. We therefore also calculate the percentage of households that experience high and severe energy burdens for different demographic groups. Figure 2 shows the percentage of households across subgroups that experience a high energy burden (above 6%), along with the total number of households experiencing a high energy burden. Figure 2 also indicates the percentage of those households that experience a severe energy burden (above 10%).

Nationally, more than 25% (30.6 million) of all households experience a high energy burden, and about 50% (15.9 million) of all households that experience a high energy burden have a severe energy burden. These burdens are even more acute for low-income households, of which 67% (25.8 million) experience a high energy burden and 60% (15.4 million) of those experience a severe energy burden. **Appendix B** includes high and severe energy burden percentages and total households that experience a high and severe



**FIGURE 2. The percentage and number of households nationally with a high energy burden (> 6%) across different subgroups in 2017**



Note: High and severe energy burdens are not mutually exclusive, meaning that the number of households experiencing a severe burden are also counted in the percentage that experience high burdens. All severe energy burdens (> 10%) also fall into the high burden category (> 6%). The red and orange bars in figure 2 sum to the total high energy burdened households, and the number of households is the total that experience a high energy burden.

burden nationally, regionally, and in each MSA across all households and across low-income, Black, Hispanic, older adult, and renting households.

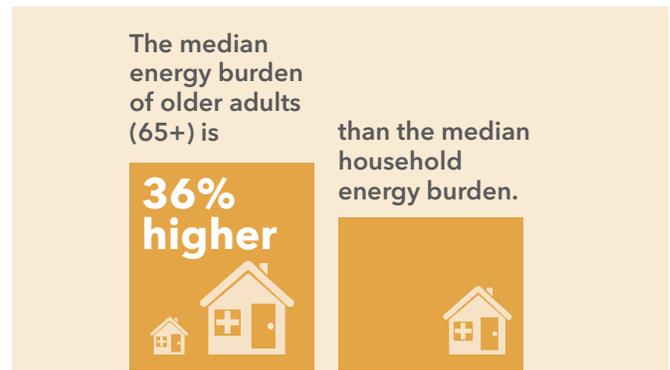
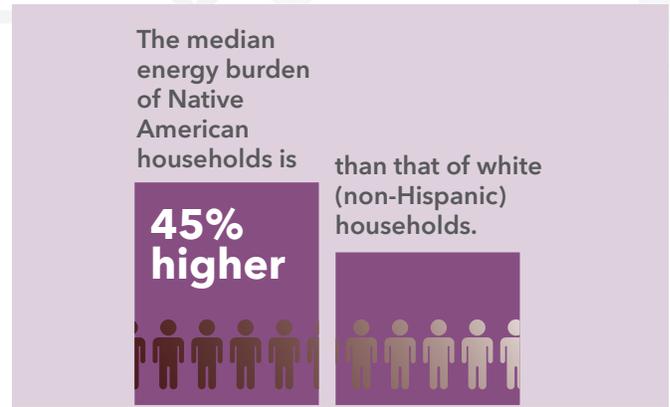
As figure 2 illustrates, U.S. residents experience high and severe energy burdens at different rates depending on factors such as income, occupant age, race, and tenure. Almost 50% of low-income multifamily residents; 36% of Black, Native American, and older adult households; 30% of renters; and 28% of Hispanic households experience a high energy burden.

Many households also have severe energy burdens, spending more than 10% of their income on energy. For example, 21% of Black households experience severe energy burdens as compared to 1% of non-low-income and 9% of non-Hispanic white households. For context, households with severe energy burdens spend at least three times more of their income on home energy bills than the median household.

### Regional Energy Burdens

National patterns play out across all regions, where low-income, Black, and Hispanic households; renters; manufactured housing residents; and older adults all have disproportionately higher energy burdens than each region’s average household. Table 2 shows the states in each census region in the study.

Across all nine regions, low-income household energy burdens are 2.1-3 times higher than the median energy burden. The gap between low-income and median energy burdens is largest in the New England, Pacific,

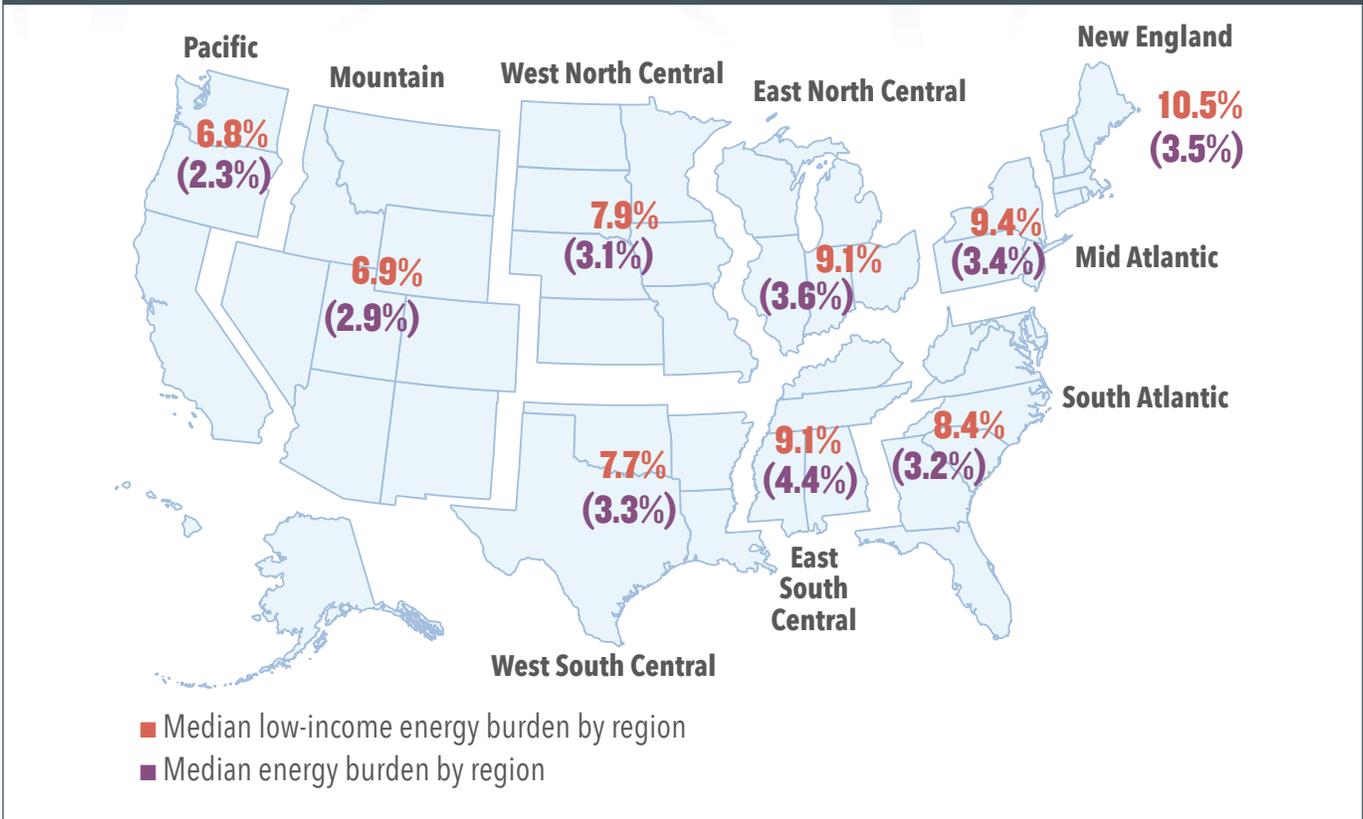


and Mid-Atlantic regions (3.0, 2.9, and 2.8 times higher, respectively). Figure 3 illustrates low-income energy burdens and the median energy burden across the nine census regions.

**TABLE 2. States within each census region**

Region	States
<b>New England</b>	Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont
<b>Middle Atlantic</b>	New Jersey, New York, Pennsylvania
<b>East North Central</b>	Illinois, Indiana, Michigan, Ohio, Wisconsin
<b>West North Central</b>	Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota
<b>South Atlantic</b>	Delaware, DC, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia
<b>East South Central</b>	Alabama, Kentucky, Mississippi, Tennessee
<b>West South Central</b>	Arkansas, Louisiana, Oklahoma, Texas
<b>Mountain</b>	Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming
<b>Pacific</b>	Alaska, California, Hawaii, Oregon, Washington

**FIGURE 3. Median low-income (< 200% FPL) energy burdens by region (red) compared to median energy burdens by region (purple)**



**REGIONAL DATA: HIGH AND SEVERE ENERGY BURDENS**

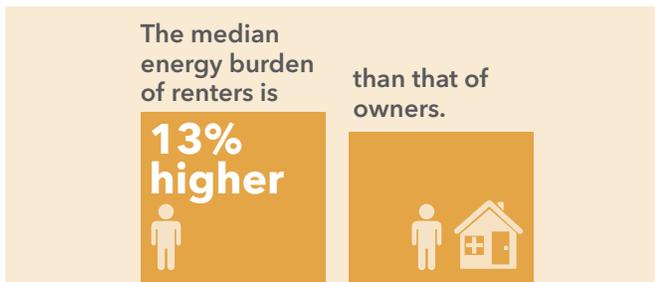
Figure 4 shows the percentage and total number of households that experience high and severe energy burdens in each region.

The percentage and total number of households that experience a high energy burden vary across regions. The East South Central region has the greatest percentage of households with high energy burdens (38%), followed

by East North Central, New England, and Middle Atlantic regions, all with 29%. The South Atlantic region had the greatest number of households (6.27 million) with high burdens, followed by the East North Central (5.40 million) and Middle Atlantic (4.57 million) regions. See **Appendix B** for the total number of highly burdened households across different groups in each region.

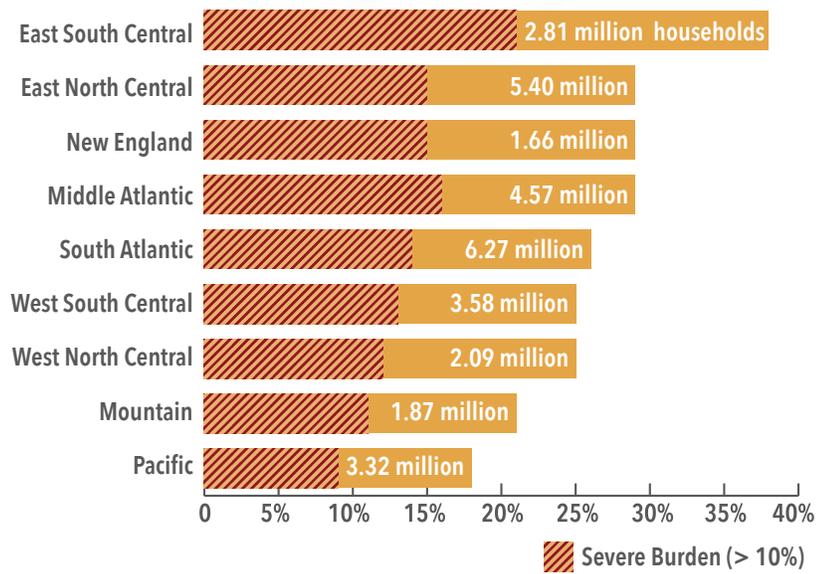
**Metro Area Energy Burdens**

Across the select MSAs—which represent 38% of all households nationally—low-income households, low-income multifamily households, and older adult households are the most energy burdened groups. Groups with the lowest energy burdens are non-low-income, those living in buildings built after 1980, and those living in market-rate multifamily housing. Table 3 includes the median energy burdens for the most highly burdened groups in each metro area; **Appendices A** and **B** offer more details.<sup>17</sup>



<sup>17</sup> **Appendix A** includes national, regional, and metro area sample sizes, median energy burdens, median incomes, median monthly bills, upper-quartile energy burdens, percentage with a high burden, and percentage with a severe burden. **Appendix A** also includes median and upper-quartile energy burdens for subgroups nationally, regionally, and in metro areas, including low-income, low-income with older adults, low-income with a child under 6, low-income with disability, low-income multifamily, non-low-income, Black, Hispanic, non-Hispanic white, older adult, renters, owners, multifamily, built before 1980, and built after 1980. **Appendix B** includes the number of households nationally, regionally, and in metro areas that experience a high or severe energy burden.

**FIGURE 4. The percentage and number of all households with a high energy burden (> 6%) in each region in 2017**



The percentage and number of all households with a high energy burden (> 6%) in 2017

The median energy burden of manufactured housing residents is

**39% higher**



than that of single family households.



Figure 5 includes the energy burdens at the median and upper quartile, showing that 50% of households in each city experience a burden above the median and 25% experience a burden above the upper quartile. For example, in Baltimore, 25% of low-income households experience an energy burden above 21.7%, which is seven times the national median burden. In five cities—Baltimore, Philadelphia, Detroit, Boston, and Birmingham—a quarter of low-income households have energy burdens above 18%, which is three times the 6% high energy burden threshold.

Across the 25 MSAs, low-income households experience energy burdens at least two times higher than the average household in all cities. In all metro areas, Black and Hispanic households experience higher energy burdens than non-Hispanic white households. Renters and people living in buildings built before 1980 experience higher energy burdens than owners in almost all metro areas in the study.

Median energy burdens do not tell the whole energy affordability story, as half of households in each group experience a higher energy burden than the median.

The median energy burden of residents in pre-1980s buildings is

**21% higher**



than that of residents in post-1980 buildings

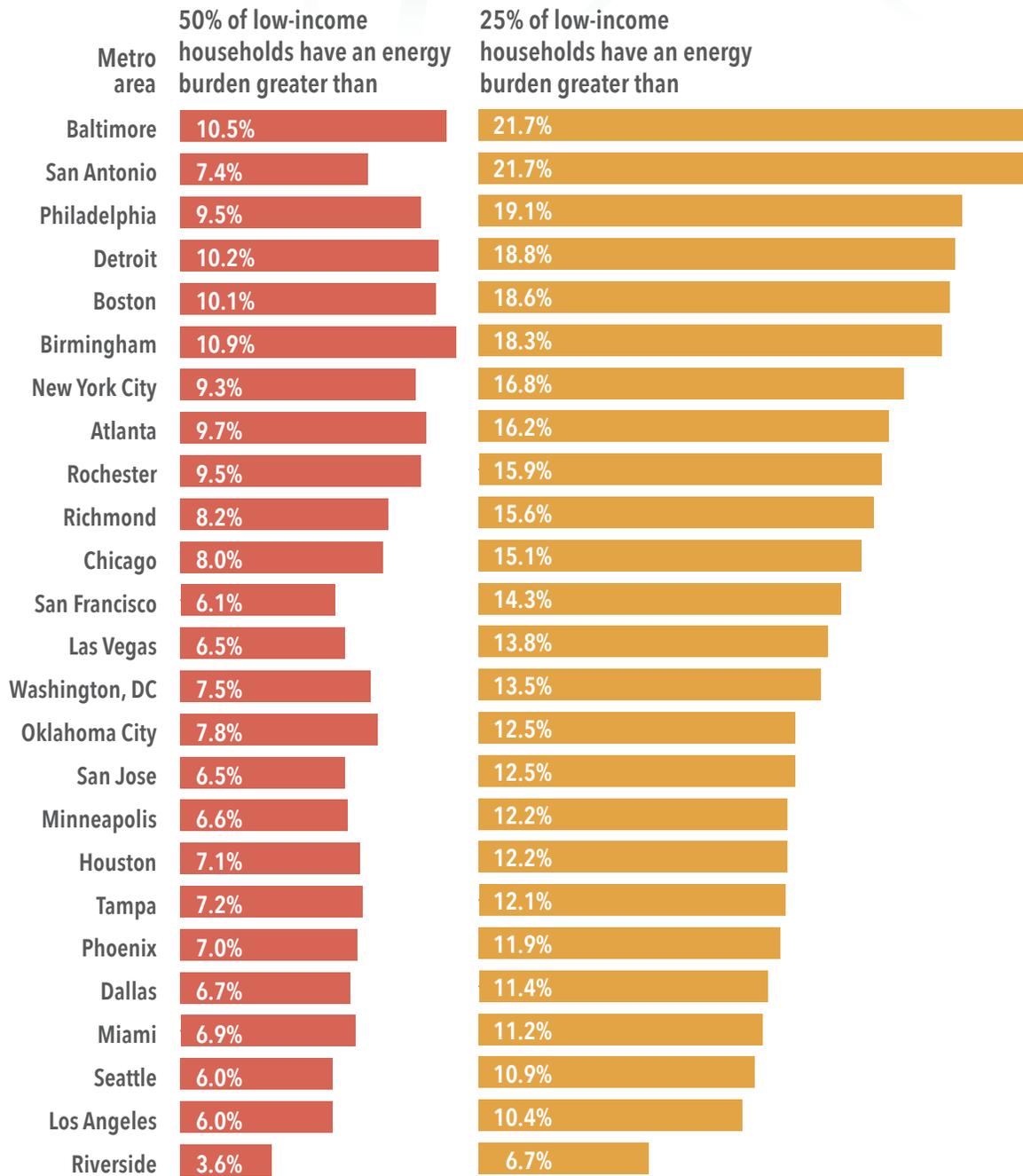


**TABLE 3. Median energy burdens in metro areas for all households and highly impacted groups, including low-income, Black, Hispanic, older adult (65+), renters, low-income multifamily residents, and those residing in buildings built before 1980**

<b>Metro area</b>	<b>All households</b>	<b>Low-income (≤ 200% FPL)</b>	<b>Black</b>	<b>Hispanic</b>	<b>Older adults (65+)</b>	<b>Renters</b>	<b>Low-income multifamily*</b>	<b>Built before 1980</b>
<b>National data</b>	3.1%	8.1%	4.2%	3.5%	4.2%	3.4%	3.1%	3.4%
<b>Atlanta</b>	3.5%	9.7%	4.1%	4.7%	5.1%	3.7%	6.6%	4.5%
<b>Baltimore</b>	3.0%	10.5%	3.8%	3.3%	4.1%	3.2%	2.5%	3.6%
<b>Birmingham</b>	4.2%	10.9%	5.6%	4.8%	5.8%	5.2%	6.8%	5.1%
<b>Boston</b>	3.1%	10.1%	3.7%	3.6%	4.4%	3.2%	6.6%	3.2%
<b>Chicago</b>	2.7%	8.0%	4.1%	3.0%	3.7%	3.1%	6.4%	2.9%
<b>Dallas</b>	2.9%	6.7%	3.3%	3.8%	3.8%	2.9%	5.0%	3.5%
<b>Detroit</b>	3.8%	10.2%	5.3%	4.5%	5.2%	4.6%	6.0%	4.3%
<b>Houston</b>	3.0%	7.1%	3.5%	3.4%	4.1%	3.3%	5.8%	3.4%
<b>Las Vegas</b>	2.8%	6.5%	3.2%	3.0%	3.4%	3.0%	5.3%	3.6%
<b>Los Angeles</b>	2.2%	6.0%	3.6%	2.6%	3.2%	2.4%	4.8%	2.3%
<b>Miami</b>	3.0%	6.9%	3.4%	3.1%	4.2%	3.1%	5.5%	3.3%
<b>Minneapolis</b>	2.2%	6.6%	2.6%	2.7%	3.0%	2.3%	4.3%	2.5%
<b>New York City</b>	2.9%	9.3%	3.6%	3.8%	4.2%	3.3%	8.0%	3.0%
<b>Oklahoma City</b>	3.3%	7.8%	3.9%	4.2%	4.0%	3.9%	6.5%	3.8%
<b>Philadelphia</b>	3.2%	9.5%	4.4%	5.2%	4.4%	3.9%	6.5%	3.6%
<b>Phoenix</b>	3.0%	7.0%	3.2%	3.6%	4.0%	2.8%	4.6%	3.6%
<b>Richmond</b>	2.6%	8.2%	3.4%	2.9%	3.5%	2.9%	5.0%	3.1%
<b>Riverside</b>	3.6%	8.7%	3.9%	3.7%	5.1%	4.0%	6.1%	4.3%
<b>Rochester</b>	3.8%	9.5%	5.1%	5.4%	4.8%	4.3%	6.0%	4.0%
<b>San Antonio</b>	3.0%	7.4%	3.1%	3.4%	4.1%	3.1%	4.8%	3.9%
<b>San Francisco</b>	1.4%	6.1%	2.4%	1.2%	2.4%	1.4%	4.9%	1.4%
<b>San Jose</b>	1.5%	6.5%	1.8%	1.9%	2.4%	1.5%	4.7%	1.6%
<b>Seattle</b>	1.8%	6.0%	2.3%	2.0%	2.4%	1.8%	4.1%	2.0%
<b>Tampa</b>	2.8%	7.2%	3.6%	3.5%	3.8%	2.8%	4.9%	3.3%
<b>Washington, DC</b>	2.0%	7.5%	2.9%	2.7%	2.9%	2.0%	5.2%	2.3%

\* Low-income multifamily households are below 200% FPL and in a building with five or more units.

**FIGURE 5. Energy burden experienced by 50% and 25% of low-income households in 25 metro areas**

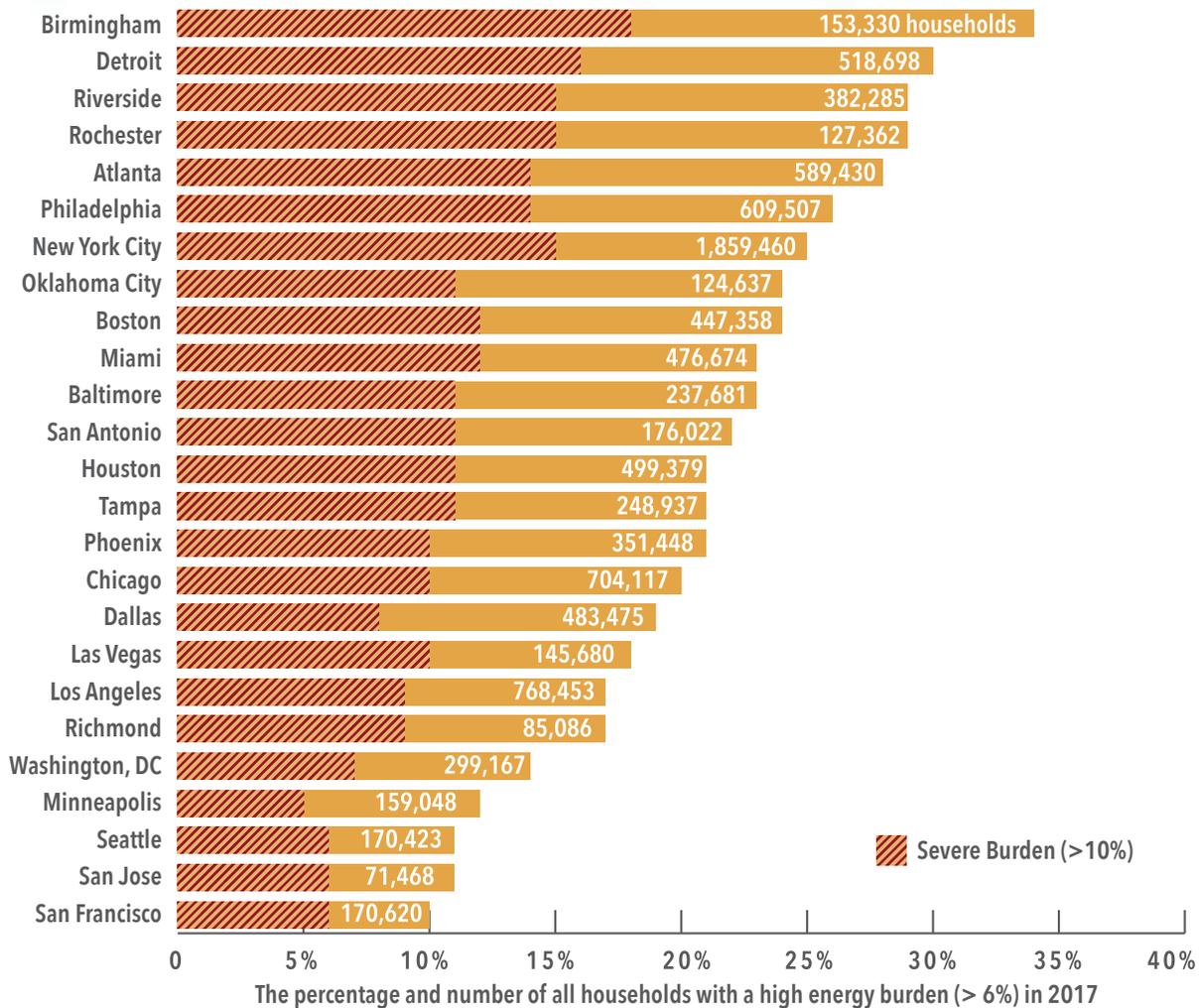


**METRO DATA: HIGH AND SEVERE ENERGY BURDENS**

The percentage of households experiencing a high energy burden varied across the select metro areas, with up to one-third of residents in some cities facing a high energy burden. Figure 6 shows the percentage and total

number of households in each metro area that experience high and severe energy burdens. Six metro areas have a greater percentage of households with a high energy burden than the national average (25%), including Birmingham (34%), Detroit (30%), Riverside (29%), Rochester (29%), Atlanta (28%), and Philadelphia (26%).

**FIGURE 6. The percentage and number of all households with a high energy burden (> 6%) in each of the 2017 AHS MSAs**



**Appendix B** includes data on high and severe energy burdens in each metro area in our sample. In nine metro areas, 12% or more of households experienced a severe energy burden, spending more than 10% of their income on energy bills; among these are 1.1 million households in New York City, 333,000 in Philadelphia, and 288,000 in Atlanta.

As these findings illustrate, high and severe energy burdens are both a national and a local challenge. Even though some metro areas have lower percentages of households with high energy burdens than the national average, each city has tens to hundreds of thousands of households with high energy burdens. In addition, both the national energy burden trends and the metro-level trends show similar patterns of energy burden vulnerability for specific groups and are therefore likely reflected in other metro areas nationally as well. This indicates that both the metro areas studied and

other cities have energy burden disparities in their communities. They also have opportunities to create policy and programs to lower these energy burdens for their residents.

By focusing on the needs of those who are disproportionately burdened—particularly at the intersection of criteria such as of low-income, communities of color, older adults, and renters—policymakers can set policies and create programs that have the greatest impact on energy insecurity. As they do so, they should recognize that many households—especially those with high energy use due to building inefficiencies—experience much higher than average energy burdens. These households are therefore likely to need targeted and long-lasting interventions, such as energy efficiency and weatherization, to achieve long-term affordability.

# Low-Income Weatherization Can Reduce High Energy Burdens



Energy efficiency and weatherization provide a long-term solution to reducing high energy burdens, while also complementing bill payment assistance and programs aimed at energy-saving education and behavior change. *Weatherization* refers to programs that address the efficiency of the building envelope and building systems (such as unit heating, cooling, lighting, windows, and water heating) through energy audits; these audits identify cost-effective energy efficiency upgrades provided through energy efficiency programs. Other low-income energy efficiency programs may include additional measures such as appliance replacements, efficient lighting, and health and safety measures. While these recommendations focus on weatherization and energy efficiency as a long-term solution to reducing high energy burdens, these investments can be combined with renewable energy technologies and/or electrification strategies to further reduce energy bills.

Energy efficiency programs and investments that provide comprehensive building upgrades—such as insulation, air sealing, heating and cooling systems, appliances, lighting, and other baseload measures—can strongly impact long-term energy affordability, as low-income households tend to live in older buildings and have older, less-efficient appliances than higher income households (Cluett, Amann, and Ou 2016). Research suggests that weatherization measures can reduce energy use by 25–35% (DOE 2014, 2017; DOE 2011). Assuming a 25% reduction in energy use and using the 2017 AHS data, we estimate that energy efficiency and

weatherization can reduce the energy burden of the average low-income household by 25%.<sup>18</sup>

Low-income energy efficiency and weatherization programs are especially important in the wake of the economic recession and pandemic. These programs can both reduce high energy burdens and help stimulate the economy through local job creation and workforce development. Policies that accelerate investment in, improve the design of, and better target low-income energy efficiency, weatherization, and housing retrofit programs can have a high impact on long-term energy affordability.

<sup>18</sup> We assume a 25% savings from energy efficiency upgrades based on the U.S. Department of Energy's estimate (DOE 2014) and use the median low-income household values to calculate a 25% reduction. We reduced the median low-income energy bill by 25% from \$1,464 to \$1,098. Using the median low-income household income of \$18,000, this equates to a reduced energy burden of 6.1%. Reducing the median low-income energy burden from 8.1% to 6.1% is a 25% reduction. Following this same methodology, our 2016 metro energy burden report estimates a 30% reduction based on the 2011 and 2013 AHS data.

# Strategies to Accelerate, Improve, and Better Target Low-Income Housing Retrofits, Energy Efficiency, and Weatherization



**M**any local and state governments, utilities, and community-based organizations have already begun to identify energy efficiency as a key strategy for lowering high energy burdens. To date, we have identified nine cities (Atlanta, Cincinnati, Houston, Minneapolis, New Orleans, Oakland, Philadelphia, Pittsburgh, Saint Paul) and six states (Colorado, New Jersey, New York, Oregon, Pennsylvania, Washington) that have set energy-burden-focused policies, goals, or programs with energy efficiency as a key component (see **Appendix C**). For example, the State of Oregon's *Ten-Year Plan to Reduce the Energy Burden in Oregon Affordable Housing* states that its goal is to "reduce the energy burden on the low-income population in Oregon, while prioritizing energy efficiency to achieve that reduction" (OR DOE, OR PUC, and OHCS 2019). At the city level, Philadelphia's Clean Energy Vision Plan set a goal to eliminate the energy burden for 33% of Philadelphians. To accomplish this, the city has designed and funded multiple pilot programs to reduce high energy use in multifamily and single-family buildings. See **Appendix C** for more information on energy-burden-focused city- and state-led actions.

**FIGURE 7. Key strategies to lower high energy burdens by better targeting low-income energy efficiency programs, ramping up investment, and improving program design and best practices**

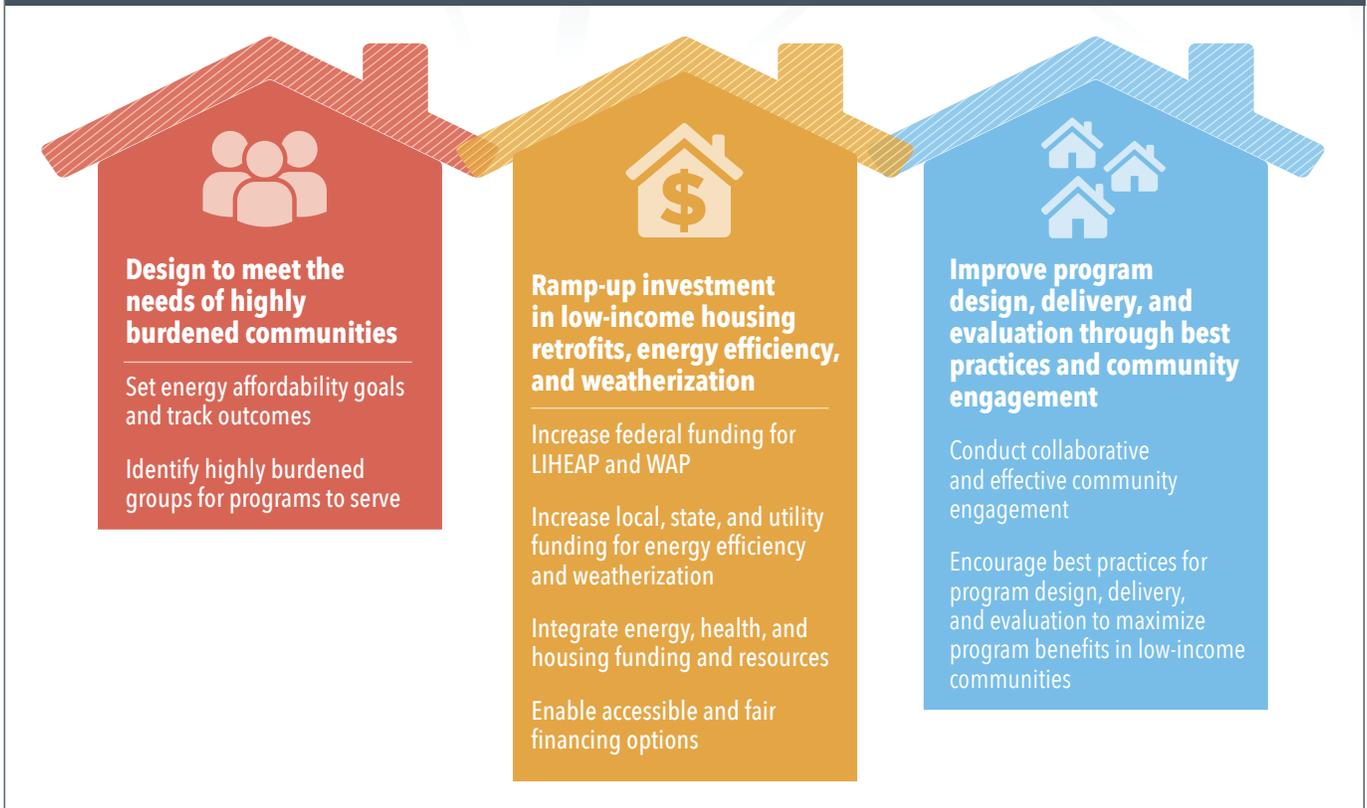


Figure 7 illustrates the key strategies to design programs to meet the needs of highly burdened communities, increase funding, and improve program design to have the greatest impact.

## Design to Meet the Needs of Highly Burdened Communities

Focusing low-income energy efficiency and weatherization investment on residents with the highest burdens can greatly alleviate energy insecurity. Local and state governments and utilities can conduct more granular and detailed energy insecurity studies or analyses to help identify which local communities have the highest burdens. They can also use other energy equity and justice-related metrics and indicators to target resources to and investment in these communities. One tool for doing this analysis is the U.S. Department of Energy (DOE) Low Income Energy Affordability Data (LEAD) tool (see text box 1). Policymakers and program implementers can use a community-based approach to develop programs to invest in communities with high burdens. Cities and states can also set energy affordability goals and policies, and then track outcomes to ensure that the communities most impacted by energy insecurity receive the benefits of energy efficiency investments.

### TEXT BOX 1. ENERGY BURDEN ASSESSMENTS: LOW INCOME ENERGY AFFORDABILITY DATA (LEAD) TOOL

The Department of Energy's Low Income Energy Affordability Data Tool (LEAD), developed with the National Renewable Energy Laboratory, aims to help states, communities, and other stakeholders create better energy strategies and programs by improving their understanding of low-income housing and community energy characteristics. LEAD is a web-accessible interactive platform that allows users to build their own state, county, and census tract and city profiles with specific household energy characteristics associated with various income levels and housing type, vintage, and tenure. The tool provides three principal metrics—energy burden, annual average housing energy costs, and housing counts—along with map and chart-based visualizations (Ma et al. 2019). States and local governments have begun using the LEAD tool in planning. For example, New Jersey cited its use of LEAD in the development of its new Office of Clean Energy Equity (New Jersey Legislature 2020).

LEAD is available for free at [energy.gov/eere/slsc/maps/lead-tool](https://energy.gov/eere/slsc/maps/lead-tool).

## SET ENERGY AFFORDABILITY GOALS AND TRACK OUTCOMES

State and local policymakers can set energy affordability and energy burden goals as a first step to addressing energy insecurity in their communities. Examples of such goals include reducing energy burdens by certain percentages, lowering energy burdens for all households to a certain threshold, or targeting resources toward individuals with high energy burdens. By focusing on the needs of those who are disproportionately burdened—particularly at the intersection of criteria such as income, race and ethnicity, and age—policymakers can set policies and create programs that have the greatest impact on addressing energy insecurity. Table 4 lists cities that have established energy burden and affordability goals.

**Appendix C** includes additional city and state energy burden policies.

To establish energy burden goals, cities, states, and utilities can conduct baseline studies to understand the state of energy burdens, poverty, housing, and access to energy efficiency investments in their communities. They can then establish an appropriate goal and strategies to accomplish that goal.

Coordinating goal setting with other state and local priorities can help cities to streamline their efforts. Some cities—such as Minneapolis and New Orleans—include energy burden goals in their climate action plans as a strategy to reduce greenhouse gas emissions and achieve more equitable outcomes. States such as New

York have also used energy burdens in statewide energy affordability policy plans.

Energy burden maps and visualizations are a useful tool for cities and states to achieve more equitable and affordable energy in their communities, move resources toward overburdened communities, and address other climate and equity goals. The DOE’s LEAD tool provides one way to create energy burden visualizations. Plans should include specific strategies for lowering high energy burdens, as well as methods and strategies to track iterative progress.

In addition to goals, some cities have begun using energy burden as an equity indicator metric. For example, the city of Oakland includes energy cost burden as a metric in its *2018 Equity Indicators* report (City of Oakland 2018) to measure equity within essential housing services. The city found that energy burdens were higher for Black, Hispanic, and Asian households in the city as compared to white households. Similarly, the Minneapolis Climate Action Plan indicates that reporting on plan progress should also include equity indicators to measure whether energy burden reductions are equitable (City of Minneapolis 2013). Text box 2 offers examples of how governors and policymakers in four states—Pennsylvania, New York, Oregon, and Washington—created goals and policies around energy burdens to address energy insecurity in their states. To date, energy burden goals are largely set and acted upon by climate and energy officials at the city and state level. Such metrics and goals are rarely part of larger

**TABLE 4. Cities with energy burden goals and strategies**

City	Description	Data source
<b>Atlanta</b>	The Resilience Strategy includes action to lift energy burden on 10% of Atlanta households.	City of Atlanta 2017
<b>Cincinnati</b>	The Green Cincinnati Plan set a goal to reduce household energy burdened by 10% compared to current levels.	City of Cincinnati 2018
<b>Houston</b>	The Climate Action Plan includes a goal to promote weatherization programs to reduce residential energy consumption and focus on reducing energy burdens of low-income populations.	City of Houston 2020
<b>Minneapolis</b>	The Climate Action Plan states that the city will prioritize neighborhoods with high energy burdens for strategy implementation.	City of Minneapolis 2013
<b>New Orleans</b>	The Climate Action Plan includes two strategies to reduce the high energy burdens of the city’s residents.	City of New Orleans 2017
<b>Philadelphia</b>	The Clean Energy Vision Plan set a goal to eliminate the energy burden for 33% of Philadelphians.	City of Philadelphia 2018
<b>Saint Paul</b>	The city set a 10-year goal to reduce resident energy burden so that no household will spend more than 4% of its income on energy bills.	City of Saint Paul 2017

## TEXT BOX 2. CASE STUDIES: STATE-LED ENERGY AFFORDABILITY EFFORTS

**New York Energy Affordability Goal.** In 2016, Governor Andrew M. Cuomo became one of the first U.S. government officials to issue a policy aimed at addressing high energy burdens. Through the state's first ever Energy Affordability policy, he aims to ensure that no New Yorker spends more than 6% of their household income on energy (New York 2016). New York continues to explore pathways to reducing energy burden to 6% for all New Yorkers through a combination of enhanced bill assistance, energy efficiency, and increased coordination among state agencies responsible for energy, bill assistance, and affordable housing.

Oregon's Strategies to Achieve Affordability. Issued by Governor Kate Brown in 2017, Executive Order 17-20 targets state agencies to improve energy efficiency. Section 5(b) emphasizes a prioritization of energy efficiency in affordable housing to reduce utility bills (Oregon 2017). In response to this directive, the Oregon Housing and Community Service Department partnered with the DOE and the Public Utility Commission to develop an assessment to identify the energy burden of Oregon's low-income population and also prioritize energy efficiency. The interagency assessment concluded that energy costs for low-income Oregonians are nearly \$350 million per year, and it identified more than \$113 million annual potential energy cost savings that can be achieved through low-income energy efficiency programs across the state (OR DOE, OR PUC, and OHCS 2019). The order identifies a number of strategies to achieve these cost savings, such as adopting energy codes for new buildings and including retrofit measures, such as smart thermostats and replacing electric resistance heating.

Pennsylvania Energy Affordability Study. In 2019, the Pennsylvania Public Utility Commission (PA PUC) released a report that examined home energy affordability for the state's low-income customers (Pennsylvania PUC 2019a). The report's goal was to determine what constitutes an affordable energy burden for low-income households in the state, which would advise changes to the bill payment assistance programs to achieve these affordable energy burden levels. In 2020, the PA PUC set a new policy to direct the state's regulated utilities to ensure that low-income customers spend no more than 10% of their income on energy bills and that the lowest-income customers spend no more than 6% of their income on energy bills (Pennsylvania PUC 2019b).

Washington Clean Energy Transformation Act. In 2019, Governor Jay Inslee passed the Clean Energy Transformation Act (CETA), which sets specific goals to achieve 100% clean electricity across Washington by 2045. Under CETA, the Washington Department of Commerce will assess the energy burdens of low-income households and the energy assistance offered by electric utilities. The department will consult with local advocates of vulnerable populations and low-income households to improve energy assistance programs. The department will publish a statewide summary to include the estimated level of energy burden and energy assistance among electric customers, identify drivers of energy burden and energy efficiency potential, and assess the effectiveness of current utility programs and mechanisms to reduce energy burdens (Washington State Department of Commerce 2020).

public health strategies and priorities despite their wide-reaching health implications.

### IDENTIFY HIGHLY BURDENED GROUPS FOR PROGRAMS TO SERVE

Overburdened households, especially Black, Native American, Hispanic, and other communities of color, often are either marginalized and overlooked by utilities' energy efficiency program marketing or face additional barriers to program participation, such as high cost or financing barriers (Leventis, Kramer, and Schwartz 2017). Creating targeted energy efficiency marketing beyond direct billing mailers can drive positive outcomes for the whole system.

Policymakers can also look beyond energy burden as an indicator to identify highly burdened groups, taking into account factors such as income, unemployment

rates, race and ethnicity, geography, education, and multiple other stressors—including air pollution and health indicators. By using metrics beyond energy burden, policymakers and program implementers can better invest resources in communities that experience the highest levels of marginalization underinvestment, and negative social and health impacts (Lin et al. 2019). Policymakers can design and implement programs that meet the needs of highly burdened groups through robust community engagement. For example, local governments can design programs to improve access to affordable, energy-efficient housing by mandating or incentivizing stringent energy efficiency standards, streamlining permit and inspection processes, and amending zoning codes for construction of more housing units, while also using neighborhood approaches to involve and empower community members in these processes (Samarripas and de Campos Lopes 2020).

### TEXT BOX 3. MEETING THE NEEDS OF HIGHLY BURDENED GROUPS: CASE STUDIES

**Minneapolis Green Zones:** The Minneapolis Climate Action Plan’s Environmental Justice Working Group developed the idea of *Green Zones*, a place-based policy initiative aimed at improving health and supporting economic development. The city used data to identify two such zones—a Northern Green Zone and a Southern Green Zone—where residents face disproportionate burdens across areas such as equity, displacement, air quality, brownfields and soil contamination, housing, green jobs, food access, and greening (City of Minneapolis 2020). Once created, the city designed programs to direct investment into these communities. The Green Zones provide an example of how policymakers can work to identify highly burdened communities and create programs that meet the needs of residents in these areas.

**Energy Burden as a Program Qualification: Efficiency Vermont.** Efficiency Vermont (EVT), the energy efficiency program implementer for the state’s utility-funded energy efficiency programs, conducted a 2018 study of equity measurements to better understand how the clean energy industry defines, collects, analyzes, and reports data on equity. This study informed changes to the design of EVT’s Targeted High Use Program, which launched in 2011 and originally qualified customers based on two factors: income (< 80% of Area Median Income [AMI]) and a minimum energy use of 10,000 kWh/year. The program historically served approximately 350 households per year, working with the DOE’s Weatherization Assistance Program (WAP) to conduct energy assessments and then install LEDs and water-saving measures, identify appliances for replacement, and replace high-efficiency heat pumps and heat pump water heaters where appropriate. Through its equity analysis, EVT determined that the energy use threshold was too high and excluded many customers with high energy burdens—but lower energy use—from accessing the program. In 2019, EVT changed the program qualification to two factors: income (< 80% AMI) and electric energy burden ( $\geq 3\%$ ). This change allowed it to recenter the program around energy burden reduction by qualifying not only more customers but also those who have high energy burdens yet may have previously been disqualified based on their energy use.

Efforts to alleviate high energy burdens should aim not only to identify those with high burdens and energy use but also to understand who has been overlooked by past efforts and develop strategies to address the needs of these households. Text box 3 contains additional case studies of city- and utility-led strategies to meet the needs of their overburdened communities.

### Accelerate Investment in Low-Income Housing Retrofits, Energy Efficiency, and Weatherization

The current need for low-income energy efficiency and weatherization far exceeds allocated resources. In 2017, utility-led energy efficiency administrators allocated only 5% of electric and 22% of natural gas energy efficiency expenditures to low-income programs (CEE 2019). This funding allocation shows that energy efficiency funds are not currently distributed to ensure that low-income households have equitable access to these investments and their benefits.

Policymakers and advocates can work toward leveraging and allocating additional funding for low-income energy efficiency and weatherization programs. They can also help ensure that these programs follow best practices to increase their impact. Following are several useful strategies for ramping up additional funding for low-income energy efficiency and weatherization.

### INCREASE FEDERAL FUNDING FOR LIHEAP AND WAP

Although an estimated 36 million U.S. households are currently eligible for weatherization, the DOE’s Weatherization Assistance Program (WAP) has served only 7 million households over the past 40 years (Bullen 2018; DOE 2016). WAP serves about 100,000 homes per year through DOE and leveraged funds, which is far fewer than both the eligible households nationally and the 15.7 million severely energy burdened households estimated in this study (NASCS 2020b). At the current rate, it would take 360 years to weatherize all eligible households through WAP—assuming no more households become WAP-eligible over time.

Congress funds WAP and allows funds to be transferred to the program from the Department of Health and Human Services’ Low-Income Home Energy Assistance Program (LIHEAP). WAP can also utilize additional leveraged funds. States can transfer 15% (or up to 25% with a waiver) of LIHEAP bill assistance funds to WAP to supplement DOE weatherization funding. Over the past 10 years, annual expenditures directed toward weatherization have ranged from \$1 billion to \$3 billion per year, with the American Recovery and Reinvestment Act greatly increasing low-income funding for WAP (Brown et al. 2019). The National Association for State Community Services Programs’ 2018 funding report estimates that WAP grantees had access to \$1.1 billion in total available funding in 2018, with \$247 million direct base funding from the DOE, \$453

million from LIHEAP-transferred funding, and \$408 million from utilities, state-sourced revenue, and other sources (NASCS 2020b). Non-DOE WAP funds in 2018 added an additional \$861 million, or \$3.48 for every DOE-invested dollar (NASCS 2020b).

The federal government has the ability to increase both WAP and LIHEAP budgets to better meet households' needs. From 2008 to 2018, DOE base funding for WAP has fluctuated from a high of \$450 million in 2009 to a low of \$68 million in 2012 (DOE 2009, 2012). In 2020, Congress allocated \$305 million to WAP—a 23% increase (\$58 million) compared to the funds allocated in 2018 (DOE 2020). Even so, leveraging additional state, local, and other funding helps supplement and increase available weatherization funds. In addition, states can decide to increase the LIHEAP percentage they transfer to WAP to better support the program. Further, it is essential that the increased demand for adequate cooling systems be assessed in the allocation of WAP and LIHEAP funds. For households across the South, rising temperatures and the increasing frequency and duration of heat waves are likely to increase cooling needs—and thus energy expenses (Berardelli 2019).

The COVID-19 pandemic has added to the urgency of increasing support for low-income bill payment assistance. On May 8, 2020, the federal government authorized \$900 million in supplemental LIHEAP funding to help “prevent, prepare for, or respond to” home energy needs surrounding the national emergency created by COVID-19 (HHS 2020). On May 15, 2020, the U.S. House of Representatives passed the Health and Economic Recovery Omnibus Emergency Solutions (HEROES) Act, which would add an additional \$1.5 billion for LIHEAP to address energy access and security issues resulting from the COVID-19 pandemic (116<sup>th</sup> Congress 2020). As of publication, the Senate has not passed this legislation.

## **INCREASE STATE, LOCAL, AND UTILITY FUNDING FOR ENERGY EFFICIENCY AND WEATHERIZATION**

Funding from states, local governments, and utilities can also support low-income energy efficiency and weatherization efforts. In many states, PUCs can set low-income energy efficiency spending and/or savings requirements—as well as energy burden reduction targets—for their regulated utilities. As of 2017, of the 27 states with electric and/or natural gas Energy Efficiency Resource Standards (EERS), 18 had low-income energy efficiency spending requirements in place (Berg and Drehobl 2018; Gilleo 2019). States and local governments can also fund and implement their own energy efficiency and weatherization programs separately from WAP or as

**Policy approaches can be aligned to leverage funding resources and maximize benefits for residents, including reduced energy burdens and safer and healthier housing.**

a WAP add-on. They can, for example, allocate funds—such as from Community Development Block Grants (CDGB)—to joint or independent energy efficiency and weatherization programs.

**Appendix C** and text box 4 include examples of cities and states that created independent energy efficiency and weatherization programs to address high energy burdens.

## **INTEGRATE ENERGY, HEALTH, AND HOUSING FUNDING AND RESOURCES.**

High energy burdens, housing, and health are inextricably linked. In our study, many of the groups who experience high energy burdens also live in inadequate housing and disproportionately suffer from a variety of other harms, including higher than average exposures to environmental pollution (Tessum et al. 2019) and higher than average rates of certain preventable illnesses and diseases (CDC 2013). Although the recent COVID-19 pandemic has sharply illustrated this disparity, the same story plays out across a variety of preventable harms.<sup>19</sup> Policy approaches can be aligned to leverage funding resources and maximize benefits for residents, including reduced energy burdens and safer and healthier housing.

The benefits of these programs can be much greater when the goals of saving energy and protecting health are sought in tandem. Typical energy efficiency and weatherization services can provide a range of health benefits. Poorly sealed building envelopes allow pests, moisture, and air pollution to infiltrate (Institute of Medicine 2011), which can harm respiratory health through pest allergies, mold growth, and lung disease. Leaky windows, faulty HVAC systems, and poor insulation can lead to cold drafts and extreme home temperatures during summer and winter months. This can trigger heat-related illnesses and asthma attacks, as well as exacerbate other respiratory illnesses (AAFA 2017; American Lung Association 2020; CDC 2016). Addressing these issues through energy efficiency and weatherization will result in improved health outcomes; it will also reduce household energy burdens.

<sup>19</sup> For more on the disparities among COVID-19 fatalities, see Malcolm and Sawani (2020); Hooper, Nápoles, and Pérez-Stable (2020); and CDC (2020).

#### TEXT BOX 4. CITY- AND STATE-FUNDED ENERGY AFFORDABILITY PILOT PROGRAMS

**Philadelphia:** To meet its energy burden goals, Philadelphia has partnered on multiple pilot programs to reduce high energy burdens for low-income single and multifamily households. In 2017, the Philadelphia Energy Authority (PEA) launched its Multifamily Affordable Housing Pilot program in partnership with public and private-sector groups, including the local electric and natural gas utilities, property owners, energy service companies, program implementers, contractors, and technology providers (PEA 2020a). The program's goal was to deliver deep energy savings of more than 30% to low-income multifamily building residents in the city. In 2018, PEA and partners completed the program's first phase, which included low-cost measures and measures to collect energy data. These data were then used in the second phase to design deeper savings measures, such as HVAC and building envelope measures.

In response to COVID-19, PEA is developing a platform with its partners and advocates to coordinate and streamline low-income homeowner services aimed at improving home safety, health, affordability, and comfort (PEA 2020b). Set to launch in 2021, PEA's Built to Last pilot program aims to deliver comprehensive home improvements that will reduce energy burden while improving health and safety. The program will serve 80–100 homes and will streamline benefit screening, property assessment, and construction management. To cover program costs, Built to Last aims to combine available funding with grants and microfinancing options. PEA plans to deploy the Built to Last program at a larger scale in 2022 (PEA 2020b).

**Pittsburgh.** The city recognized that while Pittsburgh residents have some of the lowest utility rates in the country, they still pay almost twice the national average for their energy bills, leading to high energy burdens. Over the course of a few years, Pittsburgh developed a Climate Action Plan and launched both its resilience strategy (OnePGH) and its equality indicator project. These three projects helped the city identify residential energy burden as one of the primary challenges that local communities face (City of Pittsburgh 2019). As part of the Bloomberg Mayor's Challenge, Pittsburgh created Switch PGH to address high energy burdens through a civic engagement tool that gamifies home improvement (Mayors Challenge 2018). Switch PGH helps residents make lasting energy efficiency behavior changes and incentivizes home upgrades to reduce energy burdens.

**Colorado.** The Colorado State Energy Office awarded GRID Alternatives, a solar installer that focuses on the low-income market, a \$1.2 million grant to launch a demonstration project with the goal of reducing the energy burden for more than 300 low-income households. The program also aimed to improve understanding of how to make community solar programs with low-income participants mutually beneficial for both utilities and participants (Cook and Shah 2018) Through this program, households saved from 15% to more than 50% on their utility bills, with an average annual savings of \$382.

Myriad programs exist to address health and safety issues within homes, as well as to preserve and grow the affordable housing stock. Opportunities exist to integrate these programs and resources to more comprehensively address the energy, health, and housing needs of the households most in need of assistance.<sup>20</sup> For example, many homes must defer energy efficiency investments due to a home's physical issues, such as those related to structural deficiencies, moisture, and/or mold. According to Rose et al. (2015), WAP agencies estimated that such issues led to a 1–5% deferral rate for WAP income-eligible homes. In some areas, however, the problem is worse. In western Wisconsin, for example, a Community Action Agency and WAP provider serving four counties reported a deferral rate approaching 60% (NASCSP 2020a). Addressing nonenergy-related housing issues would allow more homes to be weatherization-ready.

Integrating programs creates opportunities to streamline

administration and reduce operating redundancies that can leave more funding for energy efficiency and weatherization measures that enable households to save on energy costs. Pooling resources and establishing cross-sector referral networks not only stretches program budgets, but it also can make programs more accessible for residents by streamlining eligibility and enrollment processes. For instance, offering a single contact point or a streamlined process can give participants a variety of services simultaneously to meet their energy, health, and housing needs (Levin, Curry, and Capps 2019). This can help mitigate barriers that arise when people have to navigate multiple separate services with varying eligibility requirements and enrollment processes. Efficiency Vermont's Healthy Homes Initiative (HHI) is one such example. A partnership between the state's WAP partners and community-based organizations that offer health interventions, HHI is coordinated through Vermont's Office of Economic Opportunity. Using

<sup>20</sup> ACEEE recently published several reports exploring the intersection of health and energy, including *Protecting the Health of Vulnerable Populations with In-Home Energy Efficiency: A Survey of Methods for Demonstrating Health Outcomes* ([www.aceee.org/research-report/h1901](http://www.aceee.org/research-report/h1901)); *Making Health Count: Monetizing the Health Benefits of In-Home Services Delivered by Energy Efficiency Programs* ([www.aceee.org/research-report/h2001](http://www.aceee.org/research-report/h2001)); and *Braiding Energy and Health Funding for In-Home Programs: Federal Funding Opportunities* ([www.aceee.org/research-report/h2002](http://www.aceee.org/research-report/h2002)).

One Touch, an electronic platform for healthy home resources, HHI has established a robust referral network and successfully integrated healthy home principles into its residential energy efficiency program design.

The health sector is also beginning to realize the efficiencies of combining health and energy assessments and interventions (Hayes and Gerbode 2020). For example, a single contractor could be trained to both identify and address a family's asthma triggers, energy efficiency needs, and fall risks, thereby reducing the associated logistical burden on residents who might otherwise have to coordinate each service individually. Efforts such as this are beginning to appear across the country. In 2015, the state of Washington directed more than \$4 million in competitive grants to fund collaborations among clinical practitioners, home retrofitters, and community service organizations as a means of empowering clinicians and others to refer participants for a range of coordinated services (e.g., comprehensive in-home repairs and community health worker visits) (Levin, Curry, and Capps 2019). In New York, the State Energy Research and Development Authority (NYSERDA) recently kicked off a value-based payment pilot program that seeks to implement a healthy homes approach; through this program, Medicaid managed care organizations will partly cover residential upgrades when healthcare cost savings and benefits to residents are verified (NYSERDA 2018). Such cross-sectoral approaches to energy efficiency and weatherization seek to address some of the major root causes of health and energy inequities while making enrollment and participation feasible and accessible for residents. The benefits of energy efficiency cut across the health and energy sectors; by working to integrate resources, policymakers can maximize these benefits.

Housing policy can also help ensure that energy efficiency is integrated into efforts to upgrade and expand the affordable housing stock. State and local governments can play a key role in these integrating approaches. For example, a growing number of state housing finance agencies (HFAs)—state-chartered entities responsible for ensuring affordable housing across states—have included energy efficiency requirements in their allocation criteria for low-cost financing programs such as federal Low-Income Housing Tax Credits and grant programs administered to local governments. The same is true for local housing authorities, which increasingly incorporate energy efficiency into the maintenance and repair of their subsidized housing stock (EPA 2018). Text box 5 offers a brief case study of how one local government systematically required energy efficiency in its rental certification process, ensuring that all types of rental housing meet a specific level of energy performance.

## **ENABLE ACCESSIBLE AND FAIR FINANCING OPTIONS**

Many low-income households face barriers—such as credit eligibility—to investing in energy efficiency; these barriers can prevent them from participating in energy efficiency programs or installing energy efficiency upgrades that require financing for up-front costs. With the right consumer protections in place, financing can enable households to undertake cost-effective energy efficiency investments to lower their energy usage and bills. Local and state governments, utilities, private lenders, and nonprofit or community-based organizations can act to create and/or enable low- or no-cost financing options (i.e., payments are offset by energy cost savings) for energy efficiency investments.

Several types of financing instruments, such as on-bill payment (i.e., loan repayments included on the utility bill) and energy service agreements are becoming more common (Leventis, Kramer, and Schwartz 2017). Similarly, opportunities such as Commercial Property Assessed Clean Energy (C-PACE) can increase energy efficiency financing in the affordable multifamily sector. SEE Action's 2017 report, *Energy Efficiency Financing for Low- and Moderate-Income Households*, provides a comprehensive overview of the pros and cons of various financing options for both single and multifamily low-income households (Leventis, Kramer, and Schwartz 2017).

## **Improve program design, delivery, and evaluation through best practices and community engagement**

Program designers and implementers can collaborate and effectively engage with a community to create programs that fit its specific needs rather trying to fit the community into an existing program design. They can also incorporate best practices into their program design, delivery, and evaluation, and can emulate successful peer program models to increase program effectiveness and impact.

## **CONDUCT COLLABORATIVE AND EFFECTIVE COMMUNITY ENGAGEMENT**

To create programs that effectively reduce high energy burdens, energy efficiency and renewable energy program designers and implementers can work to engage and include local stakeholders throughout the program planning and implementation processes.

By connecting with, listening to, and partnering with community-serving organizations and community members in highly impacted communities, program

## TEXT BOX 5. THE CITY OF BOULDER'S SMARTREGS PROGRAM

In 2010, the city council in Boulder, Colorado, adopted SmartRegs, a program that requires all rental housing units in the city to demonstrate that their efficiency approximates or exceeds the standards set by the 1999 Energy Code. The program was integrated into the city's existing rental license program, which requires a rental property to obtain and renew its rental license every four years. This renewal entails an inspection for health and safety measures, and SmartRegs added energy efficiency requirements that must be met to certify that the property is approved for rental. All single- and multifamily units that offer long-term licensed rental housing are subject to the requirement. For larger multifamily buildings, a sample of representative apartments can be inspected.

Boulder also offers a companion EnergySmart program that provides technical assistance, help with selecting contractors for energy efficiency improvements, and financial incentives beyond those offered by the local utility. EnergySmart is funded primarily by Boulder County and provides services to all municipalities in the county.

SmartRegs has been recognized not only for saving energy and related costs but also for leading to widescale upgrades in the city's rental housing stock. Over the course of the eight-year compliance timeline, nearly all of the approximately 23,000 licensed rental units have become compliant (City of Boulder 2020a). The most common upgrades were attic, crawlspace, and wall insulation. The average upgrade cost has been about \$3,000 per unit, of which an average of \$579 was paid by city- and utility-sponsored rebates. As of 2018, the city estimates that the program has saved about 1.9 million kWh of electricity, 460,000 therms of natural gas, \$520,000 in energy costs, and 3,900 million metric tons of carbon dioxide. The city estimates the total investment in the program at just over \$8 million, including nearly \$1 million in rebates (City of Boulder 2020b).

administrators can identify the best measures, financing options, delivery methods, and marketing strategies to help residents reduce high energy burdens and meet their needs. Achieving this connection requires partnering with the community on program design and identifying and addressing barriers to participation for key stakeholders. This often requires engagement and trust-building over a long time period.

Robust community engagement incorporates the voices of and/or delegates power to community members. Such engagement can help develop neighborhood-centered programs that are most successful when combined with consistent funding, quality delivery infrastructure, and targeted outreach and engagement (USDN 2019). For more information on best practices in stakeholder engagement, see the DOE's Clean Energy for Low-Income Communities (CELICA) Online Toolkit at [betterbuildingsolutioncenter.energy.gov/CELICA-Toolkit/stakeholder-engagement](https://betterbuildingsolutioncenter.energy.gov/CELICA-Toolkit/stakeholder-engagement).

To include residents with high energy burdens in policy and program design, cities, states, and utilities can establish working groups, task forces, committees, and other structures that give residents a formal decision-making role. Creating this engagement when energy insecurity strategies, goals, and/or programs are first being developed allows for more input and direction from community members. Local energy planning efforts can also start with a community needs assessment led by a formal body of community residents. Local government and community leaders can then use this assessment's

findings to drive local energy affordability policies and program developments based on the findings' prioritized needs and strategies.

Policymakers and program implementers can minimize stakeholder and community participation barriers by funding or compensating participants for their time and participation in stakeholder engagement processes. For example, offering stipends to compensate participants for their time and expertise, setting realistic time expectations, creating accessible logistics, and offering additional incentives can increase participation and access (Curti, Andersen, and Write 2018). Other incentives to reduce engagement barriers include childcare, meals, and transit passes.

Policymakers can also move to a model of *energy democracy* in which community residents are innovators, planners, and decision makers on how to use and create energy in a way that is local, renewable, affordable, and just (Fairchild and Weinrub 2017). Communities that have transitioned to an energy democracy have shifted away from "an extractive economy, energy, and governance system to one that is regenerative, provides reparations, transforms power structures, and creates new governance and ownership practices (ECC 2019)." The Emerald Cities Collaborative led the creation of an *Energy Democracy Scorecard*, which provides a framework for communities to move toward an energy democracy. Policymakers can work to create energy democracy frameworks in their communities by working with community members to recognize power

imbalances and create dialogues about systemic barriers that must be addressed in order to correct long-standing injustices and inequalities in the energy and related sectors. This can help move the energy planning model to one of community self-determination and shared ownership. For more information, see [emeraldcities.org/about/energy-democracy-scorecard](http://emeraldcities.org/about/energy-democracy-scorecard).

### ENCOURAGE BEST PRACTICES FOR PROGRAM DESIGN, DELIVERY, AND EVALUATION TO MAXIMIZE BENEFITS IN LOW-INCOME COMMUNITIES

Researchers from ACEEE and other organizations have established numerous best practice strategies and case

studies of ways to improve and expand low-income energy efficiency programs and investments (Aznar et al. 2019; Nowak, Kushler, and Witte 2019; EDF 2018; Gileo, Nowak, and Drehobl 2017; Samarripas and York 2019; Cluett, Amann, and Ou 2016; Ross, Jarrett, and York 2016; Reames 2016).

Table 5 includes low-income program best practices across five categories: coordination, collaboration, and segmentation; funding and financing; measures, messaging, and targeting; evaluation and quality control; and renewables and workforce development. **Appendix D** offers more detailed descriptions and examples of each of these best practices.

**TABLE 5. Low-income program best practices by category**

<b>Coordination, collaboration, and segmentation</b>	<b>Funding and financing</b>	<b>Measures, messaging, and targeting</b>	<b>Evaluation and quality control</b>	<b>Renewables and workforce development</b>
Community engagement and participatory planning	Leverage diverse funding sources	Include health and safety measures and healthier building materials	Collect and share metrics	Integrate energy efficiency and solar
Statewide coordination models	Inclusive financing models	Prioritize deep energy-saving measures	Conduct robust research and evaluation	Support the development of a diverse and strong energy efficiency workforce
One-stop-shop program models	Align utility and housing finance programs	Integrate direct-installation and rebate programs	Include quality control	
Market segmentation		Target high energy users and vulnerable households	Incorporate nonenergy benefits	
Fuel neutral programs		Incorporate new and emerging technologies in low-income programs		
		Effectively message programs in ways that provide clear value and actionable guidance		

# Conclusions and Further Research



High energy burdens and energy insecurity are well-documented and pervasive national issues. Even in 2017, a time of economic prosperity, well over one-quarter of all U.S. households experienced a high energy burden. As this indicates, we need a renewed focus on equitable clean energy development and just energy transitions to ensure that investments in energy efficiency and renewable energy address energy insecurity. Climate change also underscores the urgency in addressing high household energy burdens. As temperatures continue to rise and heat waves become more common, access to clean, affordable energy is needed more than ever. We need cross-sectoral approaches that address the intersection of energy, health, and housing in the face of climate change.

Both nationally and in metro areas, this study finds that certain groups pay disproportionately more of their income on energy costs, including low-income households, communities of color, older adults, renters, and those residing in older buildings. Even though each metro area has a unique energy burden landscape, all cities have energy security inequities and can work to address them through collaborative policy and program decisions. Policymakers at the local, state, and utility levels can direct energy efficiency and renewable energy investments to disadvantaged and historically underinvested communities. They can then measure and ensure that these investments provide equitable benefits to local jobs, community health, and residential energy affordability.

Energy burdens are not the sole indicator of energy insecure households but rather provide one metric for determining energy insecurity. Further research is needed to identify the main physical drivers of high energy burdens, as well as the policies best suited to address the needs of the most highly energy burdened households. To better understand their communities' energy insecurity landscape, cities and states—and their energy, health, and housing agencies—as well as utilities are well-positioned to conduct detailed energy burden analyses, including qualitative data collection and interviews. Such studies would enable a first step toward setting more targeted energy affordability and energy burden goals and creating equitable, cross-sectoral policies and programs for achieving greater access to affordable energy for all.

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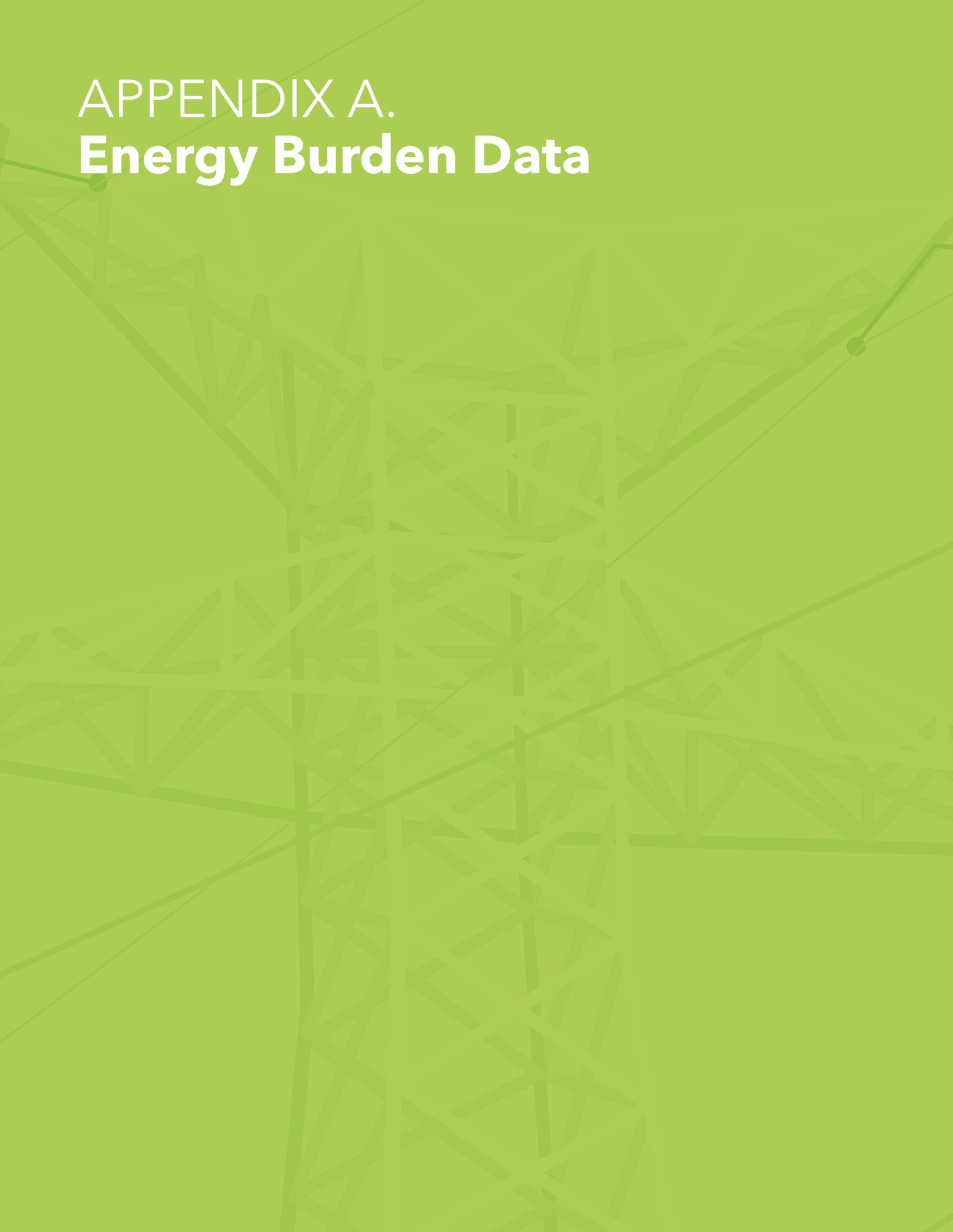
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# APPENDIX A.

## **Energy Burden Data**

The background of the page is a solid light green color. Overlaid on this background is a complex, abstract pattern of thin, darker green lines. These lines form a dense, interconnected network of geometric shapes, including triangles, squares, and irregular polygons, creating a textured, almost crystalline appearance. The lines vary in thickness and orientation, giving the overall design a sense of dynamic movement and complexity.

## Appendix A.1–National Energy Burden Data

**A1.** National energy burden data including sample sizes, median energy burdens, median income, median monthly energy bills, and the percentage of households in each group with a high and severe burden

Subgroups	Sample size	Median energy burden	Median annual income	Median annual energy expenditures	High burden percentage (>6%)	Severe burden percentage (>10%)
All households	53,539	3.1%	\$58,000	\$1,800	25%	13%
Low-income ( $\leq$ 200% FPL)	16,685	8.1%	\$18,000	\$1,464	67%	40%
Low-income with adult over 65	6,018	9.3%	\$15,000	\$1,440	74%	47%
Low-income with child under six	2,665	7.1%	\$26,400	\$1,800	59%	33%
Low-income with disability	5,759	8.7%	\$14,660	\$1,344	69%	43%
Non-low-income ( $>$ 200% FPL)	36,854	2.3%	\$84,005	\$2,040	6%	1%
White (non-Hispanic)	33,219	2.9%	\$65,000	\$1,920	23%	11%
Black	7,747	4.2%	\$36,000	\$1,560	36%	21%
Hispanic	8,435	3.5%	\$47,400	\$1,680	28%	14%
Native American	1,003	4.2%	\$40,000	\$1,680	36%	19%
Older adults (65+ years)	15,750	4.2%	\$40,015	\$1,800	36%	19%
Renters	20,455	3.4%	\$36,000	\$1,320	30%	17%
Owners	33,082	3.0%	\$75,000	\$2,160	22%	11%
Single family	37,423	3.1%	\$70,020	\$2,160	24%	12%
Multifamily (5+ units)	9,936	2.4%	\$35,450	\$960	22%	12%
Low-income multifamily (5 + units, $\leq$ 200% FPL)	4,563	5.6%	\$14,300	\$960	47%	26%
Small multifamily (2-4 units)	3,708	3.4%	\$34,700	\$1,200	29%	17%
Manufactured homes	2,440	5.3%	\$34,800	\$1,800	45%	25%
Buildings built before 1980	28,013	3.4%	\$50,040	\$1,800	29%	15%
Buildings built after 1980	25,525	2.8%	\$66,000	\$1,920	21%	11%

## Appendix A.2—Regional Energy Burden Data

**A2.1.** Regional energy burdens, including sample sizes for each region, median energy burdens, median monthly energy bill, and the percentage with high and severe burdens

Region	Sample size	Median energy burden	Median annual income	Median annual energy expenditures	Upper-quartile energy burden	High burden percentage (>6%)	Severe burden percentage (>10%)
East North Central	7,422	3.6%	\$52,500	\$1,920	6.8%	29%	15%
East South Central	2,177	4.4%	\$39,400	\$1,800	8.5%	38%	21%
Middle Atlantic	4,851	3.4%	\$60,000	\$2,040	6.8%	29%	16%
Mountain	3,932	2.9%	\$57,625	\$1,680	5.2%	21%	11%
New England	2,778	3.5%	\$71,985	\$2,640	6.7%	29%	15%
Pacific	11,177	2.3%	\$69,800	\$1,680	4.5%	18%	9%
South Atlantic	11,363	3.2%	\$56,120	\$1,920	6.2%	26%	14%
West North Central	2,412	3.1%	\$55,100	\$1,800	5.8%	25%	12%
West South Central	7,427	3.3%	\$52,000	\$1,800	6.0%	25%	13%
National	53,539	3.1%	\$58,000	\$1,800	6.0%	25%	13%

**A2.2.** Regional median energy burdens for income-based groups

Region	Low-income (≤200% FPL)	Low-income with older adults (65+)	Low-income with child under 6	Low-income with disability	Low-income multifamily (5+ units, ≤200% FPL)	Non-low-income (>200% FPL)
East North Central	9.1%	9.8%	8.2%	9.2%	6.0%	2.6%
East South Central	9.1%	10.0%	8.6%	9.9%	6.6%	2.9%
Middle Atlantic	9.4%	10.7%	7.9%	10.2%	6.9%	2.6%
Mountain	6.9%	8.4%	5.7%	7.7%	4.5%	2.2%
New England	10.5%	11.6%	9.6%	10.8%	5.6%	2.9%
Pacific	6.8%	7.5%	5.4%	6.9%	5.3%	1.7%
South Atlantic	8.4%	9.5%	7.7%	8.8%	5.8%	2.3%
West North Central	7.9%	9.1%	7.1%	7.9%	4.7%	2.5%
West South Central	7.7%	9.6%	6.6%	9.0%	5.8%	2.4%
National	8.1%	9.3%	7.1%	8.7%	5.6%	2.3%

### A2.3. Regional median energy burdens based on race/ethnicity, age, and tenure status

Region	White (non-Hispanic)	Black	Hispanic	Older adults (65+ years)	Renter	Owner
East North Central	3.4%	5.1%	3.4%	4.7%	4.2%	3.3%
East South Central	4.0%	6.2%	5.0%	5.7%	5.3%	4.0%
Middle Atlantic	3.2%	4.4%	4.5%	4.8%	3.8%	3.2%
Mountain	2.6%	3.3%	3.7%	3.8%	3.0%	2.8%
New England	3.4%	4.0%	4.6%	4.8%	3.6%	3.5%
Pacific	2.1%	3.2%	3.0%	3.3%	2.5%	2.2%
South Atlantic	2.9%	4.0%	3.4%	4.4%	3.5%	3.0%
West North Central	3.0%	4.6%	3.3%	3.9%	3.9%	2.9%
West South Central	2.9%	4.0%	4.0%	4.4%	3.6%	3.1%
National	2.9%	4.2%	3.5%	4.2%	3.4%	3.0%

### A2.4. Regional median energy burdens based on building type

Region	Single family	Multifamily (5+ units)	Low-income multifamily (5+ units, ≤200% FPL)	Built before 1980	Built after 1980
East North Central	3.6%	3.0%	6.0%	4.0%	2.9%
East South Central	4.3%	3.9%	6.6%	4.9%	3.9%
Middle Atlantic	3.5%	2.5%	6.9%	3.6%	2.9%
Mountain	2.9%	2.3%	4.5%	3.3%	2.7%
New England	3.6%	2.4%	5.6%	3.7%	3.1%
Pacific	2.4%	1.9%	5.3%	2.3%	2.3%
South Atlantic	3.2%	2.5%	5.8%	3.6%	2.9%
West North Central	3.1%	2.6%	4.7%	3.4%	2.7%
West South Central	3.3%	2.6%	5.8%	3.9%	3.0%
National	3.1%	2.4%	5.6%	3.4%	2.8%

**A2.5.** Regional upper-quartile energy burdens for income-based groups (25% of households in each group have a burden above the upper-quartile threshold)

Region	Low-income (≤200% FPL)	Low-income with older adults (65+)	Low-income with child under 6	Low-income with disability	Low-income multifamily	Non-low-income (>200% FPL)
East North Central	16.4%	17.6%	14.2%	15.9%	10.6%	3.9%
East South Central	15.7%	15.7%	18.7%	17.2%	12.0%	4.2%
Middle Atlantic	17.6%	20.1%	15.6%	18.5%	12.9%	4.0%
Mountain	12.0%	15.3%	9.6%	13.6%	8.4%	3.3%
New England	19.3%	21.7%	15.4%	19.2%	10.8%	4.5%
Pacific	12.0%	13.7%	10.2%	12.0%	9.2%	2.8%
South Atlantic	14.7%	15.9%	12.4%	15.7%	10.0%	3.6%
West North Central	14.1%	14.5%	13.7%	14.6%	8.7%	3.6%
West South Central	12.9%	17.5%	10.1%	16.5%	10.2%	3.5%
National	14.4%	16.3%	12.0%	15.6%	10.1%	3.6%

**A2.6.** Regional upper-quartile energy burdens based on race/ethnicity, age, and tenure status (25% of households in each group have a burden above the upper-quartile threshold)

Region	White (non-Hispanic)	Black	Hispanic	Older adults (65+ years)	Renter	Owner
East North Central	6.4%	10.0%	6.1%	8.4%	8.4%	6.1%
East South Central	7.4%	12.3%	9.2%	10.3%	10.9%	7.2%
Middle Atlantic	6.2%	9.8%	8.6%	9.3%	8.0%	6.1%
Mountain	4.8%	6.3%	6.2%	7.0%	5.7%	4.9%
New England	6.3%	8.1%	9.3%	9.5%	7.8%	6.0%
Pacific	4.1%	6.5%	5.6%	6.4%	5.1%	4.1%
South Atlantic	5.5%	8.0%	6.2%	8.4%	7.4%	5.5%
West North Central	5.5%	9.3%	6.1%	7.3%	7.8%	5.2%
West South Central	5.1%	7.6%	7.1%	8.6%	7.3%	5.4%
National	5.5%	8.4%	6.5%	8.1%	7.1%	5.4%

**A2.7.** Regional upper-quartile energy burdens based on building type (25% of households in each group have a burden above the upper-quartile threshold)

Region	Single family	Multifamily (5+ units)	Low-income multifamily ( $\leq 200\%$ FPL, 5+ units)	Built before 1980	Built after 1980
East North Central	6.6%	6.5%	10.6%	7.4%	5.7%
East South Central	7.8%	8.2%	12.0%	9.6%	7.5%
Middle Atlantic	6.7%	6.5%	12.9%	7.0%	5.9%
Mountain	5.0%	4.7%	8.4%	5.9%	4.8%
New England	6.4%	6.1%	10.8%	7.2%	5.6%
Pacific	4.4%	4.3%	9.2%	4.7%	4.3%
South Atlantic	6.0%	5.3%	10.0%	7.2%	5.5%
West North Central	5.7%	5.5%	8.7%	6.4%	5.1%
West South Central	5.9%	5.4%	10.2%	7.4%	5.2%
National	5.8%	5.3%	10.1%	6.7%	5.3%

## Appendix A.3–Metro-Level Energy Burden Data

**A3.1.** Metro-level energy burdens, including sample sizes for each city, median energy burdens, median monthly energy bill, and percentage with high burden and severe burden

Metro area	Sample size	Median energy burden	Median annual income	Median annual energy expenditures	Upper-quartile energy burden	High burden percentage (>6%)	Severe burden percentage (>10%)
Atlanta	1,957	3.5%	\$60,000	\$2,280	6.5%	28%	14%
Baltimore	1,741	3.0%	\$75,100	\$2,280	5.5%	23%	11%
Birmingham	1,755	4.2%	\$53,300	\$2,280	7.4%	34%	18%
Boston	1,728	3.1%	\$81,925	\$2,640	5.8%	24%	12%
Chicago	1,788	2.7%	\$65,350	\$1,800	4.8%	20%	10%
Dallas	2,472	2.9%	\$60,000	\$1,920	4.9%	19%	8%
Detroit	1,917	3.8%	\$57,000	\$2,160	6.9%	30%	16%
Houston	2,164	3.0%	\$60,000	\$1,800	5.3%	21%	11%
Las Vegas	1,968	2.8%	\$54,700	\$1,560	4.8%	18%	10%
Los Angeles	2,351	2.2%	\$61,900	\$1,440	4.4%	17%	9%
Miami	1,978	3.0%	\$48,050	\$1,440	5.5%	23%	12%
Minneapolis	1,943	2.2%	\$81,000	\$1,920	3.6%	12%	5%
New York City	1,510	2.9%	\$67,500	\$1,920	6.0%	25%	15%
Oklahoma City	2,111	3.3%	\$52,000	\$1,800	5.8%	24%	11%
Philadelphia	1,852	3.2%	\$66,500	\$2,160	6.3%	26%	14%
Phoenix	2,000	3.0%	\$60,000	\$1,800	5.2%	21%	10%
Richmond	1,933	2.6%	\$69,000	\$1,920	4.7%	17%	9%
Riverside	2,070	3.6%	\$58,750	\$2,160	6.7%	29%	15%
Rochester	1,807	3.8%	\$56,000	\$2,160	6.7%	29%	15%
San Antonio	2,014	3.0%	\$55,000	\$1,800	5.4%	22%	11%
San Francisco	1,950	1.4%	\$100,000	\$1,440	2.9%	10%	6%
San Jose	2,043	1.5%	\$109,000	\$1,560	2.9%	11%	6%
Seattle	2,162	1.8%	\$79,800	\$1,440	3.3%	11%	6%
Tampa	1,701	2.8%	\$52,000	\$1,560	5.3%	21%	11%
Washington, DC	2,214	2.0%	\$100,000	\$2,160	3.9%	14%	7%
National	53,539	3.1%	\$58,000	\$1,800	6.0%	25%	13%

### A3.2. Metro-level median energy burdens for income-based groups

Metro area	Low-income (≤200% FPL)	Low-income with older adults (65+)	Low-income with child under 6	Low-income with disability	Low-income multifamily (5+ units, ≤200% FPL)	Non-low-income (>200% FPL)
Atlanta	9.7%	12.6%	8.1%	10.4%	6.6%	2.7%
Baltimore	10.5%	11.4%	7.8%	10.0%	7.5%	2.6%
Birmingham	10.9%	12.9%	9.3%	10.7%	6.8%	3.0%
Boston	10.1%	11.8%	9.5%	10.4%	6.6%	2.6%
Chicago	8.0%	9.5%	5.9%	8.0%	6.4%	2.1%
Dallas	6.7%	10.0%	6.0%	8.1%	5.0%	2.4%
Detroit	10.2%	12.0%	8.6%	10.7%	6.0%	2.8%
Houston	7.1%	9.9%	5.8%	9.6%	5.8%	2.2%
Las Vegas	6.5%	8.3%	5.0%	6.5%	5.3%	2.2%
Los Angeles	6.0%	6.4%	4.9%	6.1%	4.8%	1.6%
Miami	6.9%	8.0%	5.0%	7.6%	5.5%	2.1%
Minneapolis	6.6%	8.7%	4.7%	7.0%	4.3%	2.0%
New York City	9.3%	11.4%	7.5%	11.0%	8.0%	2.1%
Oklahoma City	7.8%	9.5%	6.1%	8.7%	6.5%	2.6%
Philadelphia	9.5%	10.4%	8.1%	10.1%	6.5%	2.4%
Phoenix	7.0%	8.3%	5.6%	7.3%	4.6%	2.4%
Richmond	8.2%	10.3%	6.9%	8.4%	5.0%	2.3%
Riverside	8.7%	10.6%	6.7%	9.6%	6.1%	2.7%
Rochester	9.5%	10.1%	7.9%	9.4%	6.0%	2.9%
San Antonio	7.4%	9.5%	6.0%	8.6%	4.8%	2.4%
San Francisco	6.1%	7.0%	4.7%	6.6%	4.9%	1.2%
San Jose	6.5%	8.1%	4.4%	7.6%	4.7%	1.2%
Seattle	6.0%	6.8%	4.4%	6.0%	4.1%	1.6%
Tampa	7.2%	8.0%	5.6%	8.0%	4.9%	2.1%
Washington, DC	7.5%	9.3%	5.9%	8.3%	5.2%	1.8%
National	8.1%	9.3%	7.1%	8.7%	5.6%	2.3%

### A3.3. Metro-level median energy burdens based on race/ethnicity, age, and tenure status

Metro area	White (non-Hispanic)	Black	Hispanic	Older adults (65+)	Renter	Owner
Atlanta	3.1%	4.1%	4.7%	5.1%	3.7%	3.4%
Baltimore	2.8%	3.8%	3.3%	4.1%	3.2%	2.9%
Birmingham	3.8%	5.6%	4.8%	5.8%	5.2%	3.9%
Boston	3.0%	3.7%	3.6%	4.4%	3.2%	3.0%
Chicago	2.4%	4.1%	3.0%	3.7%	3.1%	2.5%
Dallas	2.6%	3.3%	3.8%	3.8%	2.9%	3.0%
Detroit	3.5%	5.3%	4.5%	5.2%	4.6%	3.6%
Houston	2.5%	3.5%	3.4%	4.1%	3.3%	2.7%
Las Vegas	2.7%	3.2%	3.0%	3.4%	3.0%	2.7%
Los Angeles	1.8%	3.6%	2.6%	3.2%	2.4%	2.1%
Miami	2.5%	3.4%	3.1%	4.2%	3.1%	2.8%
Minneapolis	2.2%	2.6%	2.7%	3.0%	2.3%	2.2%
New York City	2.6%	3.6%	3.8%	4.2%	3.3%	2.7%
Oklahoma City	3.1%	3.9%	4.2%	4.0%	3.9%	3.1%
Philadelphia	2.9%	4.4%	5.2%	4.4%	3.9%	3.0%
Phoenix	2.8%	3.2%	3.6%	4.0%	2.8%	3.1%
Richmond	2.4%	3.4%	2.9%	3.5%	2.9%	2.6%
Riverside	3.4%	3.9%	3.7%	5.1%	4.0%	3.4%
Rochester	3.6%	5.1%	5.4%	4.8%	4.3%	3.6%
San Antonio	2.7%	3.1%	3.4%	4.1%	3.1%	3.0%
San Francisco	1.2%	2.4%	1.2%	2.4%	1.4%	1.4%
San Jose	1.4%	1.8%	1.9%	2.4%	1.5%	1.5%
Seattle	1.8%	2.3%	2.0%	2.4%	1.8%	1.8%
Tampa	2.6%	3.6%	3.5%	3.8%	2.8%	2.9%
Washington, DC	1.7%	2.9%	2.7%	2.9%	2.0%	2.0%
National	2.9%	4.2%	3.5%	4.2%	3.4%	3.0%

### A3.4. Metro-level median energy burdens based on building type

Metro area	Single family	Multifamily (5+ units)	Low-income multifamily (5+ units, ≤200% FPL)	Built before 1980	Built after 1980
Atlanta	3.7%	2.5%	6.6%	4.5%	3.3%
Baltimore	3.2%	2.5%	7.5%	3.6%	2.4%
Birmingham	4.1%	3.5%	6.8%	5.1%	3.6%
Boston	3.1%	2.2%	6.6%	3.2%	2.6%
Chicago	2.6%	2.7%	6.4%	2.9%	2.2%
Dallas	3.1%	2.2%	5.0%	3.5%	2.7%
Detroit	3.8%	2.5%	6.0%	4.3%	3.0%
Houston	3.0%	2.5%	5.8%	3.4%	2.7%
Las Vegas	2.8%	2.4%	5.3%	3.6%	2.7%
Los Angeles	2.3%	2.1%	4.8%	2.3%	2.1%
Miami	2.9%	2.9%	5.5%	3.3%	2.6%
Minneapolis	2.3%	1.8%	4.3%	2.5%	2.0%
New York City	3.0%	2.4%	8.0%	3.0%	2.4%
Oklahoma City	3.2%	3.3%	6.5%	3.8%	2.9%
Philadelphia	3.3%	2.7%	6.5%	3.6%	2.5%
Phoenix	3.1%	2.1%	4.6%	3.6%	2.8%
Richmond	2.6%	2.1%	5.0%	3.1%	2.3%
Riverside	3.5%	3.9%	6.1%	4.3%	3.3%
Rochester	3.7%	3.2%	6.0%	4.0%	3.4%
San Antonio	3.0%	2.6%	4.8%	3.9%	2.7%
San Francisco	1.5%	1.3%	4.9%	1.4%	1.4%
San Jose	1.6%	1.2%	4.7%	1.6%	1.3%
Seattle	1.9%	1.5%	4.1%	2.0%	1.7%
Tampa	2.8%	2.2%	4.9%	3.3%	2.5%
Washington, DC	2.2%	1.4%	5.2%	2.3%	1.9%
National	3.1%	2.4%	5.6%	3.4%	2.8%

**A3.5.** Metro-level upper-quartile energy burdens for income-based groups (25% of households in each group have a burden above the upper-quartile threshold)

<b>Metro area</b>	<b>Low-income (≤200% FPL)</b>	<b>Low-income with older adults (65+)</b>	<b>Low-income with child under 6</b>	<b>Low-income with disability</b>	<b>Low-income multifamily</b>	<b>Non-low-income (&gt;200% FPL)</b>
Atlanta	16.2%	19.1%	12.8%	17.9%	11.7%	4.1%
Baltimore	21.7%	34.0%	10.9%	27.1%	5.5%	3.8%
Birmingham	18.3%	20.0%	17.1%	17.7%	13.9%	4.6%
Boston	18.6%	21.8%	16.0%	21.4%	11.7%	4.2%
Chicago	15.1%	17.5%	11.2%	13.2%	12.7%	3.1%
Dallas	11.4%	17.1%	8.5%	15.4%	7.9%	3.6%
Detroit	18.8%	21.2%	13.6%	19.8%	9.6%	4.3%
Houston	12.2%	20.2%	9.0%	22.0%	9.8%	3.2%
Las Vegas	13.8%	21.8%	8.0%	13.7%	10.9%	3.2%
Los Angeles	10.4%	11.4%	8.4%	11.2%	8.7%	2.6%
Miami	11.2%	13.3%	10.0%	13.0%	10.0%	3.0%
Minneapolis	12.2%	14.8%	6.9%	12.6%	7.7%	2.9%
New York City	16.8%	21.8%	14.1%	18.6%	15.0%	3.4%
Oklahoma City	12.5%	14.0%	9.9%	12.4%	10.2%	3.7%
Philadelphia	19.1%	24.9%	14.7%	20.0%	12.1%	3.8%
Phoenix	11.9%	15.3%	9.2%	12.7%	7.3%	3.5%
Richmond	15.6%	22.0%	10.4%	19.2%	8.8%	3.3%
Riverside	15.0%	16.6%	10.7%	16.5%	9.9%	3.9%
Rochester	15.9%	20.0%	14.0%	14.7%	9.9%	4.3%
San Antonio	13.3%	16.6%	9.2%	16.2%	9.2%	3.5%
San Francisco	14.3%	14.3%	8.5%	14.4%	11.0%	2.0%
San Jose	12.5%	14.9%	7.6%	14.9%	8.9%	2.0%
Seattle	10.9%	12.0%	9.2%	9.9%	6.8%	2.4%
Tampa	12.1%	12.1%	10.7%	12.7%	9.2%	3.2%
Washington, DC	13.5%	17.6%	8.9%	15.0%	9.1%	2.9%
National	14.4%	16.3%	12.0%	15.6%	10.1%	3.6%

**A3.6.** Metro-level upper-quartile energy burdens based on race/ethnicity, age, and tenure status (25% of households in each group have a burden above the upper-quartile threshold)

Metro area	White (non-Hispanic)	Black	Hispanic	Older adults (65+)	Renter	Owner
Atlanta	5.4%	8.1%	7.4%	9.8%	7.2%	6.2%
Baltimore	5.0%	8.3%	4.9%	8.0%	6.7%	5.1%
Birmingham	6.7%	11.8%	8.7%	10.7%	10.4%	6.8%
Boston	5.6%	8.1%	7.7%	9.0%	6.8%	5.6%
Chicago	4.2%	8.5%	4.9%	7.5%	6.0%	4.4%
Dallas	4.3%	5.8%	6.0%	7.0%	5.1%	4.8%
Detroit	6.3%	9.4%	7.2%	9.0%	8.9%	6.3%
Houston	4.4%	6.6%	6.1%	8.0%	6.2%	4.8%
Las Vegas	4.6%	6.1%	5.0%	6.1%	5.3%	4.3%
Los Angeles	3.6%	6.5%	5.0%	6.1%	5.1%	3.8%
Miami	4.4%	6.9%	5.8%	8.3%	6.4%	5.0%
Minneapolis	3.5%	4.4%	4.5%	5.4%	4.2%	3.5%
New York City	5.4%	8.2%	7.9%	10.1%	7.2%	5.3%
Oklahoma City	5.4%	7.4%	6.6%	7.7%	6.8%	5.2%
Philadelphia	5.2%	10.2%	9.2%	8.4%	7.9%	5.5%
Phoenix	4.8%	6.2%	6.0%	7.0%	5.2%	5.2%
Richmond	4.1%	7.0%	5.8%	6.8%	5.5%	4.4%
Riverside	6.7%	7.3%	6.9%	9.2%	7.2%	6.4%
Rochester	6.2%	11.6%	11.4%	9.0%	8.1%	6.1%
San Antonio	4.6%	5.2%	6.4%	7.9%	5.5%	5.3%
San Francisco	2.5%	5.3%	3.6%	4.7%	3.0%	2.8%
San Jose	2.8%	3.7%	3.4%	5.0%	3.1%	2.8%
Seattle	3.2%	4.5%	4.1%	5.1%	3.6%	3.2%
Tampa	5.0%	7.1%	6.3%	6.5%	5.6%	5.2%
Washington, DC	3.0%	5.1%	5.1%	6.0%	4.4%	3.6%
National	5.5%	8.4%	6.5%	8.1%	7.1%	5.4%

**A3.7.** Metro-level upper-quartile energy burdens based on building type (25% of households in each group have a burden above the upper-quartile threshold)

Metro area	Single family	Multifamily (5+ units)	Low-income multifamily (≤200% FPL, 5+ units)	Built before 1980	Built after 1980
Atlanta	6.6%	5.3%	11.7%	8.1%	5.8%
Baltimore	5.5%	5.5%	5.5%	6.9%	4.0%
Birmingham	7.3%	6.5%	13.9%	9.7%	6.3%
Boston	5.6%	5.6%	11.7%	6.2%	4.9%
Chicago	4.5%	5.3%	12.7%	5.5%	4.0%
Dallas	5.1%	4.2%	7.9%	6.0%	4.6%
Detroit	6.8%	6.0%	9.6%	7.5%	5.7%
Houston	5.1%	5.1%	9.8%	6.1%	4.8%
Las Vegas	4.7%	4.7%	10.9%	6.7%	4.4%
Los Angeles	4.4%	4.4%	8.7%	4.5%	4.1%
Miami	5.2%	5.5%	10.0%	6.2%	4.8%
Minneapolis	3.6%	3.3%	7.7%	3.9%	3.3%
New York City	6.3%	6.6%	15.0%	5.9%	6.4%
Oklahoma City	5.5%	6.8%	10.2%	6.9%	4.7%
Philadelphia	6.2%	5.8%	12.1%	7.0%	4.9%
Phoenix	5.1%	4.2%	7.3%	6.0%	4.6%
Richmond	4.7%	4.0%	8.8%	6.0%	3.9%
Riverside	6.5%	6.9%	9.9%	7.8%	5.8%
Rochester	6.5%	6.3%	9.9%	7.1%	5.9%
San Antonio	5.5%	4.3%	9.2%	7.5%	4.5%
San Francisco	3.0%	2.6%	11.0%	2.9%	2.8%
San Jose	3.0%	2.6%	8.9%	3.1%	2.5%
Seattle	3.2%	3.2%	6.8%	3.6%	3.1%
Tampa	5.2%	4.4%	9.2%	6.5%	4.5%
Washington, DC	4.0%	3.2%	9.1%	4.5%	3.2%
National	5.8%	5.3%	10.1%	6.7%	5.3%

The background of the page is a solid red color. Overlaid on this background is a complex, abstract network of thin, light-colored lines. These lines intersect at various points, creating a web-like structure. Some lines are straight, while others are slightly curved. There are also small, dark red circular nodes at some of the intersection points, particularly on the right side of the page. The overall effect is that of a technical or data-related network.

APPENDIX B.  
**High and Severe  
Energy Burdens**

This section includes 2017 population data from the American Housing Survey (AHS) Table Creator for both national and metropolitan statistical area samples. [www.census.gov/programs-surveys/ahs/data/interactive/ahstablecreator.html](http://www.census.gov/programs-surveys/ahs/data/interactive/ahstablecreator.html).

## Appendix B.1–National High and Severe Energy Burdens

**B1.1.** Total national households in each subgroup, and each subgroup’s total households with a high energy burden (≥6%) and total households with severe energy burden (≥10%)

Category	Subgroup	Total households	Percentage highly burdened (≥6%)	Total highly burdened households (≥6%)	Percentage severely burdened (≥10%)	Total severely burdened households (≥10%)
Income	All households	121,560,000	25%	30,585,830	13%	15,861,674
	Low-income (≤200% FPL)	38,551,000	67%	25,776,144	40%	15,383,432
	Non-low-income (>200% FPL)	83,009,000	6%	5,214,246	1%	738,779
Race/ ethnicity	Black	16,552,000	36%	5,995,213	21%	3,469,788
	Native American	1,483,000	36%	541,155	19%	283,884
	Hispanic	16,496,000	28%	4,572,335	14%	2,250,966
	White (non-Hispanic)	80,550,000	23%	21,924,520	11%	10,485,640
Age	Older adults (65+)	34,929,000	36%	12,487,949	19%	6,701,933
Tenure	Renters	43,993,000	30%	13,218,332	17%	7,290,945
	Owners	77,567,000	22%	17,174,847	11%	8,431,501
Housing type	Low-income multifamily (5+ units) and low-income (≤200% FPL)	9,345,000	47%	4,413,429	26%	2,408,442
	Small multifamily (2-4 units)	8,363,000	47%	3,949,653	26%	2,155,356
	Manufactured homes	6,727,000	45%	2,999,580	25%	1,709,320
	Built before 1980	55,723,000	29%	15,911,480	15%	8,392,366
	Single family	85,791,000	24%	20,831,649	12%	10,476,575
	Multifamily (5+ units)	20,605,000	22%	4,572,668	12%	2,449,125
	Built after 1980	65,838,000	21%	14,114,223	11%	7,137,071

## Appendix B.2—Regional High and Severe Energy Burdens

**B2.1.** Total households in each region, and each region's total households with a high energy burden ( $\geq 6\%$ ) and total households with severe energy burden ( $\geq 10\%$ )

Region	Total households in region	Percentage highly burdened ( $\geq 6\%$ )	Total highly burdened households ( $\geq 6\%$ )	Percentage severely burdened ( $\geq 10\%$ )	Total severely burdened households ( $\geq 10\%$ )
East North Central	18,522,000	29%	5,371,380	15%	2,778,300
East South Central	7,417,000	38%	2,818,460	21%	1,557,570
Middle Atlantic	16,019,000	29%	4,645,510	16%	2,563,040
Mountain	8,916,000	21%	1,872,360	11%	980,760
New England	5,809,000	29%	1,684,610	15%	871,350
Pacific	18,305,000	18%	3,294,900	9%	1,647,450
South Atlantic	23,974,000	26%	6,233,240	14%	3,356,360
West North Central	8,527,000	25%	2,131,750	12%	1,023,240
West South Central	14,070,000	25%	3,517,500	13%	1,829,100
National	121,560,000	25%	30,585,830	13%	15,861,674

**B2.2.** Total low-income households in each region, and each region's total low-income households with a high energy burden ( $\geq 6\%$ ) and total low-income households with severe energy burden ( $\geq 10\%$ )

Region	Total low-income households in region	Percentage highly burdened ( $\geq 6\%$ )	Total highly burdened low-income households ( $\geq 6\%$ )	Percentage severely burdened ( $\geq 10\%$ )	Total severely burdened low-income households ( $\geq 10\%$ )
East North Central	5,979,000	74%	4,424,460	45%	2,690,550
East South Central	2,976,000	74%	2,202,240	46%	1,368,960
Middle Atlantic	4,827,000	72%	3,475,440	48%	2,316,960
Mountain	2,719,000	58%	1,577,020	33%	897,270
New England	1,621,000	75%	1,215,750	52%	842,920
Pacific	5,064,000	57%	2,886,480	33%	1,671,120
South Atlantic	8,042,000	69%	5,548,980	41%	3,297,220
West North Central	2,297,000	66%	1,516,020	39%	895,830
West South Central	5,026,000	66%	3,317,160	36%	1,809,360
National	38,551,000	67%	25,776,144	40%	15,383,432

**B2.3.** Total Black households in each region, and each region's total Black households with a high energy burden ( $\geq 6\%$ ) and total Black households with severe energy burden ( $\geq 10\%$ )

Region	Total Black households in region	Percentage highly burdened ( $\geq 6\%$ )	Total highly burdened Black households ( $\geq 6\%$ )	Percentage severely burdened ( $\geq 10\%$ )	Total severely burdened Black households ( $\geq 10\%$ )
East North Central	2,336,000	43%	1,004,480	25%	584,000
East South Central	1,595,000	51%	813,450	31%	494,450
Middle Atlantic	2,437,000	38%	926,060	25%	609,250
Mountain	359,000	27%	96,930	13%	46,670
New England	401,000	33%	132,330	17%	68,170
Pacific	1,077,000	26%	280,020	15%	161,550
South Atlantic	5,485,000	35%	1,919,750	20%	1,097,000
West North Central	585,000	40%	234,000	24%	140,400
West South Central	2,277,000	34%	774,180	19%	432,630
National	16,552,000	36%	5,995,213	21%	3,469,788

**B2.4.** Total Hispanic households in each region, and each region's total Hispanic households with a high energy burden ( $\geq 6\%$ ) and total Hispanic households with severe energy burden ( $\geq 10\%$ )

Region	Total Hispanic households in region	Percentage highly burdened ( $\geq 6\%$ )	Total highly burdened Hispanic households ( $\geq 6\%$ )	Percentage severely burdened ( $\geq 10\%$ )	Total severely burdened Hispanic households ( $\geq 10\%$ )
East North Central	1,083,000	26%	281,580	12%	129,960
East South Central	197,000	38%	74,860	23%	45,310
Middle Atlantic	2,052,000	38%	779,760	22%	451,440
Mountain	1,721,000	27%	464,670	13%	223,730
New England	563,000	40%	225,200	23%	129,490
Pacific	4,466,000	23%	1,027,180	11%	491,260
South Atlantic	2,695,000	26%	700,700	12%	323,400
West North Central	360,000	26%	93,600	15%	54,000
West South Central	3,359,000	31%	1,041,290	15%	503,850
National	16,496,000	28%	4,572,335	14%	2,250,966

**B2.5.** Total older adult (65+) households in each region, and each region’s total older adult (65+) households with a high energy burden ( $\geq 6\%$ ) and total older adult (65+) households with severe energy burden ( $\geq 10\%$ )

<b>Region</b>	<b>Total older adult (65+) households in MSA</b>	<b>Percentage highly burdened (<math>\geq 6\%</math>)</b>	<b>Total highly burdened older adult households (<math>\geq 6\%</math>)</b>	<b>Percentage severely burdened (<math>\geq 10\%</math>)</b>	<b>Total severely burdened older adult households (<math>\geq 10\%</math>)</b>
East North Central	4,711,000	39%	1,837,290	20%	942,200
East South Central	1,902,000	49%	931,980	26%	494,520
Middle Atlantic	4,228,000	41%	1,733,480	23%	972,440
Mountain	2,258,000	30%	677,400	15%	338,700
New England	1,578,000	41%	646,980	24%	378,720
Pacific	4,328,000	27%	1,168,560	14%	605,920
South Atlantic	6,402,000	37%	2,368,740	21%	1,344,420
West North Central	2,202,000	32%	704,640	17%	374,340
West South Central	3,058,000	37%	1,131,460	21%	642,180
National	34,929,000	36%	12,487,949	19%	6,701,933

**B2.6.** Total renting households in each region, and each region's total renting households with a high energy burden ( $\geq 6\%$ ) and total renting households with severe energy burden ( $\geq 10\%$ )

Region	Total renting households in region	Percentage highly burdened ( $\geq 6\%$ )	Total highly burdened renting households ( $\geq 6\%$ )	Percentage severely burdened ( $\geq 10\%$ )	Total severely burdened renting households ( $\geq 10\%$ )
East North Central	5,945,000	37%	2,199,650	21%	1,248,450
East South Central	2,458,000	46%	1,130,680	28%	688,240
Middle Atlantic	6,279,000	34%	2,134,860	21%	1,318,590
Mountain	3,091,000	24%	741,840	12%	370,920
New England	2,092,000	34%	711,280	19%	397,480
Pacific	7,910,000	21%	1,661,100	11%	870,100
South Atlantic	8,395,000	31%	2,602,450	17%	1,427,150
West North Central	2,616,000	34%	889,440	19%	497,040
West South Central	5,207,000	31%	1,614,170	17%	885,190
National	43,993,000	30%	13,218,332	17%	7,290,945

## Appendix B.3–Metro Area High and Severe Energy Burdens

**B3.1.** Total households in each MSA, and each MSA's total households with a high energy burden ( $\geq 6\%$ ) and total households with severe energy burden ( $\geq 10\%$ )

Metro area	Total households in MSA	Percentage highly burdened ( $\geq 6\%$ )	Total highly burdened households ( $\geq 6\%$ )	Percentage severely burdened ( $\geq 10\%$ )	Total severely burdened households ( $\geq 10\%$ )
Atlanta	2,108,800	28%	589,430	14%	287,711
Baltimore	1,047,600	23%	237,681	11%	120,345
Birmingham	447,000	34%	153,330	18%	80,995
Boston	1,853,800	24%	447,358	12%	230,652
Chicago	3,526,500	20%	704,117	10%	362,906
Dallas	2,564,700	19%	483,475	8%	216,838
Detroit	1,723,300	30%	518,698	16%	269,687
Houston	2,329,000	21%	499,379	11%	249,689
Las Vegas	798,600	18%	145,680	10%	80,347
Los Angeles	4,395,700	17%	768,453	9%	390,770
Miami	2,090,600	23%	476,674	12%	249,435
Minneapolis	1,379,600	12%	159,048	5%	71,714
New York City	7,428,000	25%	1,859,460	15%	1,111,740
Oklahoma City	515,900	24%	124,637	11%	57,920
Philadelphia	2,308,400	26%	609,507	14%	332,798
Phoenix	1,685,600	21%	351,448	10%	165,189
Richmond	489,500	17%	85,086	9%	46,342
Riverside	1,314,500	29%	382,285	15%	197,493
Rochester	439,700	29%	127,262	15%	64,726
San Antonio	805,700	22%	176,022	11%	88,011
San Francisco	1,706,200	10%	170,620	6%	100,622
San Jose	657,700	11%	71,468	6%	38,953
Seattle	1,485,700	11%	170,423	6%	83,837
Tampa	1,182,800	21%	248,937	11%	127,945
Washington, DC	2,178,800	14%	299,167	7%	149,583
<b>National</b>	<b>120,062,818</b>	<b>25%</b>	<b>30,585,830</b>	<b>13%</b>	<b>15,861,674</b>

**B3.2.** Total low-income households in each MSA, and each MSA's total low-income households with a high energy burden ( $\geq 6\%$ ) and total low-income households with severe energy burden ( $\geq 10\%$ )

Metro area	Total low-income households in MSA	Percentage highly burdened ( $\geq 6\%$ )	Total highly burdened low-income households ( $\geq 6\%$ )	Percentage severely burdened ( $\geq 10\%$ )	Total severely burdened low-income households ( $\geq 10\%$ )
Atlanta	589,900	79%	466,021	48%	283,152
Baltimore	241,200	77%	185,724	52%	125,424
Birmingham	156,000	82%	127,920	54%	84,240
Boston	412,700	74%	305,398	51%	210,477
Chicago	1,025,400	68%	697,272	39%	399,906
Dallas	692,500	49%	339,325	31%	214,675
Detroit	551,700	80%	441,360	51%	281,367
Houston	731,100	61%	445,971	34%	248,574
Las Vegas	253,700	55%	139,535	33%	83,721
Los Angeles	1,371,300	50%	685,650	27%	370,251
Miami	820,900	57%	467,913	31%	254,479
Minneapolis	256,900	57%	146,433	32%	82,208
New York City	2,248,400	70%	1,573,880	48%	1,079,232
Oklahoma City	155,400	68%	105,672	37%	57,498
Philadelphia	652,300	74%	482,702	48%	313,104
Phoenix	507,800	59%	299,602	32%	162,496
Richmond	122,100	64%	78,144	40%	48,840
Riverside	453,700	71%	322,127	44%	199,628
Rochester	137,400	73%	100,302	46%	63,204
San Antonio	260,800	62%	161,696	35%	91,280
San Francisco	326,600	51%	166,566	32%	104,512
San Jose	121,500	54%	65,610	32%	38,880
Seattle	290,000	50%	145,000	28%	81,200
Tampa	377,900	61%	230,519	36%	136,044
Washington, DC	399,200	60%	239,520	36%	143,712
National	38,551,000	67%	25,776,144	40%	15,383,432

**B3.3.** Total Black households in each MSA, and each MSA's total Black households with a high energy burden ( $\geq 6\%$ ) and total Black households with severe energy burden ( $\geq 10\%$ )

<b>Metro area</b>	<b>Total Black households in MSA</b>	<b>Percentage highly burdened (<math>\geq 6\%</math>)</b>	<b>Total highly burdened Black households (<math>\geq 6\%</math>)</b>	<b>Percentage severely burdened (<math>\geq 10\%</math>)</b>	<b>Total severely burdened Black households (<math>\geq 10\%</math>)</b>
Atlanta	789,500	36%	284,220	21%	165,795
Baltimore	324,100	34%	110,194	20%	64,820
Birmingham	137,000	47%	64,390	30%	41,100
Boston	157,900	32%	50,528	16%	25,264
Chicago	682,800	37%	252,636	21%	143,388
Dallas	466,000	25%	116,500	14%	65,240
Detroit	427,900	43%	183,997	23%	98,417
Houston	482,400	29%	139,896	15%	72,360
Las Vegas	112,600	26%	29,276	18%	20,268
Los Angeles	372,200	27%	100,494	15%	55,830
Miami	459,500	29%	133,255	18%	82,710
Minneapolis	113,000	15%	16,950	7%	7,910
New York City	1,459,600	32%	467,072	21%	306,516
Oklahoma City	61,000	32%	19,520	17%	10,370
Philadelphia	542,900	39%	211,731	25%	135,725
Phoenix	107,200	26%	27,872	15%	16,080
Richmond	153,500	28%	42,980	15%	23,025
Riverside	129,300	30%	38,790	17%	21,981
Rochester	48,000	44%	21,120	29%	13,920
San Antonio	61,500	20%	12,300	11%	6,765
San Francisco	157,900	24%	37,896	15%	23,685
San Jose	20,600	14%	2,884	11%	2,266
Seattle	94,100	14%	13,174	6%	5,646
Tampa	144,500	28%	40,460	18%	26,010
Washington, DC	631,200	21%	132,552	10%	63,120
<b>National</b>	<b>16,552,000</b>	<b>36%</b>	<b>5,995,213</b>	<b>21%</b>	<b>3,469,788</b>

**B3.4.** Total Hispanic households in each MSA, and each MSA's total Hispanic households with a high energy burden (≥6%) and total Hispanic households with severe energy burden (≥10%)

Metro area	Total Hispanic households in MSA	Percentage highly burdened (≥6%)	Total highly burdened Hispanic households (≥6%)	Percentage severely burdened (≥10%)	Total severely burdened Hispanic households (≥10%)
Atlanta	168,100	35%	58,835	14%	23,534
Baltimore	42,800	21%	8,988	8%	3,424
Birmingham	14,400	40%	5,760	18%	2,592
Boston	184,900	30%	55,470	17%	31,433
Chicago	561,600	19%	106,704	9%	50,544
Dallas	592,600	25%	148,150	10%	59,260
Detroit	55,200	38%	20,976	15%	8,280
Houston	706,000	25%	176,500	11%	77,660
Las Vegas	186,600	18%	33,588	10%	18,660
Los Angeles	1,589,200	20%	317,840	10%	158,920
Miami	884,800	24%	212,352	12%	106,176
Minneapolis	60,500	16%	9,680	10%	6,050
New York City	1,544,500	33%	509,685	19%	293,455
Oklahoma City	52,300	29%	15,167	16%	8,368
Philadelphia	154,100	45%	69,345	24%	36,984
Phoenix	378,300	25%	94,575	11%	41,613
Richmond	25,100	24%	6,024	11%	2,761
Riverside	579,000	31%	179,490	15%	86,850
Rochester	25,500	44%	11,220	26%	6,630
San Antonio	400,900	27%	108,243	14%	56,126
San Francisco	284,300	12%	34,116	8%	22,744
San Jose	139,200	13%	18,096	7%	9,744
Seattle	109,600	15%	16,440	7%	7,672
Tampa	188,300	27%	50,841	16%	30,128
Washington, DC	252,700	19%	48,013	6%	15,162
National	16,496,000	28%	4,572,335	14%	2,250,966

**B3.5.** Total older adult (65+) households in each MSA, and each MSA's total older adult (65+) households with a high energy burden ( $\geq 6\%$ ) and total older adult (65+) households with severe energy burden ( $\geq 10\%$ )

<b>Metro area</b>	<b>Total older adult (65+) households in MSA</b>	<b>Percentage highly burdened (<math>\geq 6\%</math>)</b>	<b>Total highly burdened older adult households (<math>\geq 6\%</math>)</b>	<b>Percentage severely burdened (<math>\geq 10\%</math>)</b>	<b>Total severely burdened older adult households (<math>\geq 10\%</math>)</b>
Atlanta	490,700	44%	215,908	24%	117,768
Baltimore	107,700	34%	36,618	18%	19,386
Birmingham	127,800	48%	61,344	27%	34,506
Boston	516,400	38%	196,232	22%	113,608
Chicago	976,800	31%	302,808	16%	156,288
Dallas	540,500	29%	156,745	17%	91,885
Detroit	493,400	41%	202,294	22%	108,548
Houston	503,200	34%	171,088	20%	100,640
Las Vegas	204,400	26%	53,144	15%	30,660
Los Angeles	1,184,600	26%	307,996	14%	165,844
Miami	712,800	35%	249,480	20%	142,560
Minneapolis	339,300	22%	74,646	10%	33,930
New York City	2,162,800	39%	843,492	26%	562,328
Oklahoma City	123,800	35%	43,330	17%	21,046
Philadelphia	674,400	37%	249,528	21%	141,624
Phoenix	502,700	30%	150,810	14%	70,378
Richmond	131,100	29%	38,019	15%	19,665
Riverside	368,300	42%	154,686	24%	88,392
Rochester	133,600	39%	52,104	20%	26,720
San Antonio	188,100	35%	65,835	18%	33,858
San Francisco	498,900	18%	89,802	10%	49,890
San Jose	171,000	20%	34,200	11%	18,810
Seattle	361,100	19%	68,609	9%	32,499
Tampa	402,500	30%	120,750	14%	56,350
Washington, DC	546,800	25%	136,700	14%	76,552
<b>National</b>	<b>34,929,000</b>	<b>36%</b>	<b>12,487,949</b>	<b>19%</b>	<b>6,701,933</b>

**B3.6.** Total renting households in each MSA, and each MSA's total renting households with a high energy burden ( $\geq 6\%$ ) and total renting households with severe energy burden ( $\geq 10\%$ )

Metro area	Total renting households in MSA	Percentage highly burdened ( $\geq 6\%$ )	Total highly burdened renting households ( $\geq 6\%$ )	Percentage severely burdened ( $\geq 10\%$ )	Total severely burdened renting households ( $\geq 10\%$ )
Atlanta	794,400	31%	246,264	16%	127,104
Baltimore	369,100	30%	110,730	16%	59,056
Birmingham	141,700	47%	66,599	28%	39,676
Boston	715,000	28%	200,200	15%	107,250
Chicago	1,238,200	26%	321,932	14%	173,348
Dallas	1,060,200	20%	212,040	10%	106,020
Detroit	527,300	40%	210,920	21%	110,733
Houston	896,000	27%	241,920	14%	125,440
Las Vegas	400,900	21%	84,189	12%	48,108
Los Angeles	2,280,900	21%	478,989	11%	250,899
Miami	853,900	27%	230,553	15%	128,085
Minneapolis	407,700	14%	57,078	7%	28,539
New York City	3,643,800	29%	1,056,702	19%	692,322
Oklahoma City	169,200	30%	50,760	15%	25,380
Philadelphia	614,800	35%	215,180	19%	116,812
Phoenix	593,300	21%	124,593	10%	59,330
Richmond	174,500	23%	40,135	13%	22,685
Riverside	479,300	33%	158,169	16%	76,688
Rochester	144,300	36%	51,948	20%	28,860
San Antonio	305,300	22%	67,166	11%	33,583
San Francisco	375,100	13%	48,763	8%	30,008
San Jose	272,200	12%	32,664	7%	19,054
Seattle	613,600	13%	79,768	7%	42,952
Tampa	418,000	23%	96,140	13%	54,340
Washington, DC	801,800	17%	136,306	8%	64,144
National	43,993,000	30%	13,218,332	17%	7,290,945

APPENDIX C.

**City- and State-Led Actions to  
Address High Energy Burdens**

## C1. City-led actions to reduce high energy burdens

Metro area	Strategy/action	Year enacted	Description	Data source
Atlanta	Plan with energy burden strategy	2017	The Clean Energy plan includes energy burden as a key strategy for achieving the city's clean energy future.	City of Atlanta 2019
	Plan with energy burden goal	2017	The Resilience Strategy includes action to lift energy burden on 10% of Atlanta households.	City of Atlanta 2017
Cincinnati	Plan with energy burden goal	2018	The Green Cincinnati Plan set a goal to reduce household energy burdened by 10% compared to current levels.	City of Cincinnati 2018
	City-led program to reduce energy burdens	2020	The city partnered with Duke Energy Ohio to address the high energy burdens by launching a low-income multifamily energy efficiency pilot program called Warm Up Cincy.	City of Cincinnati 2020
Houston	Plan with energy burden strategy	2018	The Climate Action Plan includes a goal to promote weatherization programs to reduce residential energy consumption and focus on reducing energy burdens of low-income populations.	City of Houston 2020
Minneapolis	Plan with energy burden goal	2013	The Climate Action Plan states that the city will prioritize neighborhoods with high energy burdens for strategy implementation.	City of Minneapolis 2013
	Equity indicator	2013	Climate Action Plan reporting should also include equity indicators to measure whether energy burden reductions are equitable.	
New Orleans	Plan with energy burden goal	2017	The Climate Action Plan includes two strategies to reduce the high energy burdens of the city's residents.	City of New Orleans 2017
Oakland	Equity indicator	2018	Oakland includes energy cost burden as a metric in its 2018 Equity Indicators report.	City of Oakland 2018
Philadelphia	Plan with energy burden goal	2018	The Clean Energy Vision Plan set a goal to eliminate the energy burden for 33% of Philadelphians.	City of Philadelphia 2018
Pittsburgh	City-led program to reduce energy burdens	2019	As part of the Bloomberg Mayor's Challenge, the city created Switch PGH to address high burdens through a civic engagement tool.	City of Pittsburgh 2019
Saint Paul	Plan with energy burden goal	2017	The city set a goal to reduce resident energy burden within 10 years so that no household spends more than 4% of its income on energy bills.	City of Saint Paul 2017

See Appendix for data sources

**C2. State-led actions to reduce high energy burden**

State	Strategy/action	Year enacted	Description	Data source
Colorado	Demonstration project/pilot program	2018	The Energy Office awarded GRID Alternatives a \$1.2 million grant to launch a project to reduce the energy burden of 300 low-income households through renewable energy and energy efficiency investments.	Cook and Shah 2018
New Jersey	State legislation	2020	The NJ Clean Energy Equity Act (S. 2484) aims to use solar, storage, and energy efficiency to bring low-income households and environmental justice communities within or below the state's average energy burden.	New Jersey Legislature 2020
New York	Governor-led executive order	2016	Governor Andrew M. Cuomo issued the Energy Affordability policy to work toward a goal of no New Yorker spending more than 6% of their household income on energy.	New York 2016
Oregon	Governor-led executive order	2018	In response to Governor Kate Brown's Executive Order 17-20, the Oregon Department of Energy, the Oregon Public Utility Commission, and the Oregon Housing and Community Services Department conducted an assessment and created a 10-year plan to reduce energy burdens in Oregon affordable housing.	OR DOE, OR PUC, and OHCS 2018
Pennsylvania	Public Utility Commission study	2019	The Pennsylvania PUC released a report that assessed home energy affordability for low-income customers in the state.	Pennsylvania Public Utility Commission 2019
	Public Utility Commission policy	2020	The Pennsylvania PUC set a new policy to direct utilities to ensure that low-income customers spend no more than 10% (6% for lowest-income customers) of their income on energy bills.	Pennsylvania Public Utility Commission 2019
Washington	Governor-led executive order	2019	As part of Governor Jay Inslee's Clean Energy Transformation Act, the Washington Department of Commerce assessed the energy burdens for low-income households and the energy assistance offered by electric utilities.	Washington State Department of Commerce 2020

APPENDIX D.

**Low-Income Energy Efficiency  
Program Best Practices**

This section contains short descriptions of some best practices for low-income energy efficiency programs: coordination, collaboration, and segmentation; funding and financing; effective measures and targeting; evaluation and quality control; and coordination of energy efficiency and renewable energy investments.

## Coordination, collaboration, and segmentation

### Community engagement and participatory planning

can ensure that programs are designed to meet community needs and build trust. By involving the community in the planning process, energy efficiency programs create outcomes that best meet community needs, leverage community networks to achieve higher program participation, and improve visibility and support within the community for program implementers (e.g., a utility or local government). Participatory planning requires effort from program planners, who can follow a set of best practices for optimal success.<sup>21</sup> For example, Professor Tony Reames conducted a community engagement study of Kansas City, Missouri, to understand barriers that low-income households face in participating in weatherization. This stakeholder engagement led to the development of innovative strategies to overcome barriers, such as hiring an all-African American staff to help build trust within the local community.<sup>22</sup>

**Statewide coordination models** enable consistent low-income program delivery across utilities, WAP implementers, and local jurisdictions. Some states have one implementer for the state's low-income programs who ensures that similar program offerings are available to all customers in the state. States such as California, New Jersey, New York, Colorado, and Massachusetts offer statewide low-income program models that aim to coordinate resources from multiple sources through a single program. For example, California's Energy Saving Assistance Program is offered by all regulated investor-owned utilities across the state. Massachusetts is served by the Low-Income Energy Affordability Network (LEAN), which includes community action agencies, public and private housing owners, government organizations, and public utilities that all work together to provide low-income efficiency solutions in the state.

**One-stop-shop program models** minimize barriers and allow low-income households to access all available resources in one place. The models provide a single point of contact, universal intake applications, comprehensive technical assistance, and streamlined access to program resources.<sup>23</sup> One-stop-shop models should be replicated in various locations and combine each location's available offerings. Through its Energize Delaware program model, for example, the nonprofit Delaware Sustainable Energy Utility (DESEU) offers a one-stop-shop resource that focuses on a whole-building approach and consolidates available resources directed at both low-income customers and owners of affordable multifamily buildings.

**Market segmentation** designs programs to meet the specific needs of subsets of highly burdened households, such as people living in affordable multifamily buildings or manufactured housing. Low-income customers are a diverse segment with diverse energy needs. By segmenting customers by key demographic categories, program designers can then work to identify a specific customer segment's energy usage characteristics and program needs. This can lead to more impactful outreach, relationship building, program design, and results. For instance, Eversource partnered with Oracle Utilities-Opower to develop a first-of-kind approach to digitally characterizing and targeting customers that require assistance. This analytical approach can guide utilities in creating programs that are specific to a resident subset or area.<sup>24</sup>

**Fuel-neutral programs** allow energy efficiency measures to be completed simultaneously in a home regardless of the electric and/or natural gas utilities that service it. This is critical for addressing the high costs associated with delivered fuels (oil, propane) and for coordinating across electric and natural gas utilities. For example, New York's Clean Energy Fund, designed to deliver on the state's Reforming the Energy Vision (REV) commitments, implements energy efficiency initiatives on a fuel-neutral basis. By taking a fuel-neutral approach, New York State can increase energy efficiency at the lowest cost, enable greater greenhouse gas reductions, and stimulate local economic development.<sup>25</sup>

<sup>21</sup> Calvert, K., I. McVey, and A. Kantamneni. 2017. "Placing the 'Community' in Community Energy Planning. Prepared for *Guelph's Community Energy Initiative Task Force* by the Community Energy Knowledge-Action Partnership. DOI: 10.13140/RG.2.2.22817.30562. [www.researchgate.net/publication/319141113\\_Placing\\_the\\_'Community'\\_in\\_Community\\_Energy\\_Planning](http://www.researchgate.net/publication/319141113_Placing_the_'Community'_in_Community_Energy_Planning).

<sup>22</sup> Reames, T. 2016. "A Community-Based Approach to Low-Income Residential Energy Efficiency Participation Barriers." *The International Journal of Justice and Sustainability* Vol 21. [www.tandfonline.com/doi/abs/10.1080/13549839.2015.1136995](http://www.tandfonline.com/doi/abs/10.1080/13549839.2015.1136995).

<sup>23</sup> Energy Efficiency for All, *One-Stop Shops for the Multifamily Sector*. [assets.ctfassets.net/ntcn17ss1ow9/30B8LUDt8GTegjPE8claf/8c5e68405c9692afb9f11fe898b8653e/EEFA\\_OneStopShop\\_Fact\\_Sheet\\_2.pdf](https://assets.ctfassets.net/ntcn17ss1ow9/30B8LUDt8GTegjPE8claf/8c5e68405c9692afb9f11fe898b8653e/EEFA_OneStopShop_Fact_Sheet_2.pdf).

<sup>24</sup> Lin, J., K.M. Rodgers, S. Kabaca, M. Frades, and D. Ware. 2020. "Energy Affordability in Practice: Oracle Utilities Opower's Business Intelligence to Meet Low and Moderate Income Need at Eversource." *The Electricity Journal*. 33 (9): 1-11. [doi.org/10.1016/j.tej.2019.106687](https://doi.org/10.1016/j.tej.2019.106687).

<sup>25</sup> NYSERDA. Reforming the Energy Vision: Clean Energy Fund, Frequently Asked Questions. [www.nyserda.ny.gov/-/media/Files/About/Clean-Energy-Fund/clean-energy-fund-qa.pdf](http://www.nyserda.ny.gov/-/media/Files/About/Clean-Energy-Fund/clean-energy-fund-qa.pdf).

## Funding and financing

**Leveraging diverse funding sources** allows programs to address health and safety issues and include greater investment and available measures. Funding for low-income energy efficiency programs often comes from electric and natural gas utility ratepayer dollars, federal WAP and LIHEAP funds, state and local funds, nonprofit resources, and other private funding sources. Leveraging funding from various sources can give program implementers greater flexibility, as some federal and utility funding sources limit the types of measures they fund. Leveraging diverse funding sources can lead to a more comprehensive program outcome that has the flexibility to address health and safety issues and incorporate more complex sets of energy efficiency investments.

**Inclusive financing models**, such as no-interest loans, loan guarantees, and the elimination of credit requirements, are designed to help low-income households overcome up-front cost barriers to accessing traditional private financing options. Inclusive financing options include Pay As You Save (PAYS) programs and on-bill tariff models, which allow low-income households to install energy efficiency investments that are paid off over time on the customer's bill.<sup>26</sup> In the low-income multifamily sector, limiting or eliminating up-front costs to building owners can help them undertake more substantial energy efficiency projects and overcome barriers related to the competition for scarce funding for capital projects. Low-interest financing and on-bill repayment can help owners spread out their energy efficiency project costs over time.

**Align utility and housing finance programs** to encourage energy efficiency upgrades in low-income multifamily buildings. Incorporating utility-customer funding in the current climate of affordable housing refinance and redevelopment can yield deeper, more comprehensive energy efficiency improvements. These extensive renovations may involve replacing outdated building systems, and utility-customer funds can be used to help cover the incremental cost of installing more-efficient equipment than would otherwise be required. For example, the Connecticut Green Bank coordinates closely with the state's energy efficiency initiatives led by the state agencies and local utilities to align incentives for affordable financing for both energy efficiency upgrades and rooftop solar installations. The Connecticut Green Bank's financing opportunities complement the available funding for energy efficiency upgrades from

the Connecticut Housing Finance Authority and the Connecticut Department of Housing.<sup>27</sup>

## Effective measures, messaging, and targeting

**Include health and safety measures and healthier building materials** to reduce deferral rates and improve indoor air quality, comfort, and long-term health outcomes for program participants. Programs often address health and safety concerns through leveraged funds. However, rather than disqualifying households due to building health and safety issues such as structural problems, mold, or asbestos, utilities and program implementers can combine funding streams to provide health and safety services. For example, the Bronx Healthy Buildings Program aims to reduce asthma-related hospital visits and address the social determinants of health through education, organizing, workforce development, and building upgrades. Energy audits, building inspections, and tenant organizing aim to identify needed repairs and opportunities for energy efficiency improvements.<sup>28</sup>

**Prioritize deep energy-saving measures** through a single program and/or engagement to achieve high levels of energy savings. Using trusted contractor networks to deliver programs that include savings-based incentives lets contractors focus on deep savings rather than limiting projects to simple direct-install measures. For example, Oncor's Targeted Weatherization Low-Income program first prioritizes deep energy-saving measures such as building-shell weatherization and air sealing, and then focuses on additional measures such as air-conditioning, refrigeration, and lighting.<sup>29</sup>

**Integrate direct-installation and rebate programs** to encourage more extensive improvements. For low-income single and multifamily projects, direct-installation programs that offer no-cost energy efficiency measures can provide an opportunity to connect with building owners, complete an on-site energy assessment, and encourage owners to take advantage of rebates for more extensive improvements such as HVAC upgrades, weatherization, common-area lighting retrofits, and other building-shell improvements.

**Targeting high energy users and vulnerable households** to generate the greatest energy savings and impact. By using utility data to identify households with the highest energy use, energy efficiency providers can achieve the greatest energy savings. Even so, energy use should be looked at in combination with other factors

<sup>26</sup> For more information on inclusive financing options, see SEE Action, 2017. *Energy Efficiency Financing for Low- and Moderate Income Households: Current State of the Market, Issues, and Opportunities*. [lbi.gov/sites/default/files/news/lmi-final0811.pdf](http://lbi.gov/sites/default/files/news/lmi-final0811.pdf).

<sup>27</sup> See ACEEE's 2018 report, *Our Powers Combined: Energy Efficiency and Solar in Affordable Multifamily Buildings*. [aceee.org/research-report/u1804-buildhealthchallenge.org/communities/awardee-bronx-nyc/](https://www.aceee.org/research-report/u1804-buildhealthchallenge.org/communities/awardee-bronx-nyc/).

<sup>29</sup> Gilileo, A., S. Nowak, and A. Dreihobl. 2017. *Making a Difference: Strategies for Successful Low-Income Energy Efficiency Programs*. Washington, DC: ACEEE. [aceee.org/sites/default/files/publications/researchreports/u1713.pdf](https://www.aceee.org/sites/default/files/publications/researchreports/u1713.pdf).

that lead to household energy vulnerability. Although high energy use can lead to high savings, households with lower energy use can still experience high energy burdens. Efficiency Vermont, for example, changed its program qualification to focus on low-income households with high energy burden rather than low-income households with high energy use. This let the program qualify more customers and target needs to the most vulnerable households.<sup>30</sup>

**Incorporate new and emerging technologies in low-income programs.** Expanding the technology scope of low-income energy efficiency programs to technologies they do not traditionally incorporate—such as solar PV, smart meters, energy storage, and electric vehicles—can significantly improve energy affordability and equitable access to these technologies for low-income households.<sup>31</sup> Unless we ensure that new technologies are available to low-income and underinvested communities, inequities in access to these technologies will continue to grow. Programs that incorporate these emerging technologies can address access barriers for low-income communities and ensure more equitable distribution of their benefits.

**Effectively message programs in ways that provide clear value and actionable guidance.** Effective messaging helps achieve high program participation and builds trust and understanding of program benefits. Investing in energy efficiency often takes time and resources for both single and multifamily building owners. Although programs typically focus on energy savings and energy cost reductions benefits, programs must also market the many nonenergy benefits that result from energy efficiency improvements. Further, they should include actionable guidance—that is, clear steps that residents and building owners can take to learn more about program services and enroll in the program.

## Evaluation and quality control

**Collect and share metrics** on program outcomes, equity impacts, and other tracked data to hold implementers accountable to program requirements and goals. These metrics can include factors such as race and/or ethnicity, income status, property ownership, energy burden, and energy vulnerability. Often, program implementers publish demand-side management reports that include metrics on low-income program savings, spending, and customers served. Implementers can report additional equity factors such as energy burden data, demographic

data, and participation distribution. For example, VEIC published the *State of Equity Measurement: A Review of Practices in the Clean Energy Industry*, a guide that offers an overview of energy industry metrics for measuring program equity.<sup>32</sup> These include metrics to define target populations, determine disparate impacts, and include representative voices in program design, implementation, evaluation, and oversight.

**Conduct robust research and evaluation** to assess achieved reductions in energy usage. Such evaluations help document and clarify program performance. Impact evaluations measure the direct and indirect benefits from programs, while process evaluations provide systematic assessments of how programs operate. By completing robust evaluations, program planners can determine how to best improve their programs for greater impact and efficiency, and better meet the needs of the target community.

**Include quality control** as a core element of the services to ensure that energy efficiency services are effective, and homes are left in a safe condition. Many program implementers incorporate ongoing training for contractors and quality control professionals, viewing this as critical to program success and devoting project funding to regular trainings. Some program administrators also include strict quality control requirements for all projects rather than for a sample, which helps incentivize contractors to perform high-quality work. For example, Ouachita Electric Cooperative's HELP PAY program, a tariff-based residential energy efficiency financing program, evaluates every project after completion and facilitates trainings for its contractors in quality control techniques to ensure that all contractors understand the assessment methodologies.<sup>33</sup>

**Incorporate nonenergy benefits** into testing. Without monetizing nonenergy benefits, utility-operated low-income energy efficiency programs cost more to implement per household—and are less cost effective by traditional measures—than utility-operated energy efficiency programs serving higher income groups. However, low-income energy programs deliver benefits beyond energy savings to low-income households that are not typically incorporated into traditional cost-effectiveness testing methods. The *National Standard Practice Manual* discusses how low-income program benefits can be considered at the societal level.<sup>34</sup> States can decide to adjust cost-effectiveness tests for

<sup>30</sup> Efficiency Vermont. 2020. *Targeted Communities Program Update*. [www.energycvermont.com/trade-partners/targeted-communities-program-update](http://www.energycvermont.com/trade-partners/targeted-communities-program-update).

<sup>31</sup> Brown, M., A. Soni, M. Lapsa, and K. Southworth. 2020. *Low-Income Energy Affordability: Conclusions from a Literature Review*. ORNL/TM-2019/1150. [info.ornl.gov/sites/publications/Files/Pub124723.pdf](http://info.ornl.gov/sites/publications/Files/Pub124723.pdf).

<sup>32</sup> Levin, E., E. Palchak, and R. Stephenson. 2019. *The State of Equity Measurement: A Review of Practices in the Clean Energy Industry*. Winooski, VT: VEIC. [www.veic.org/Media/default/documents/resources/reports/equity\\_measurement\\_clean\\_energy\\_industry.pdf](http://www.veic.org/Media/default/documents/resources/reports/equity_measurement_clean_energy_industry.pdf).

<sup>33</sup> Gilleo, A., S. Nowak, and A. Dreihobl. 2017. *Making a Difference: Strategies for Successful Low-Income Energy Efficiency Programs*. Washington, DC: ACEEE. [aceee.org/sites/default/files/publications/researchreports/u1713.pdf](http://aceee.org/sites/default/files/publications/researchreports/u1713.pdf).

<sup>34</sup> National Efficiency Screening Project. 2017. *National Standard Practice Manual*. [nationalefficiencyscreening.org/wp-content/uploads/2017/05/NSPM\\_May-2017\\_final.pdf](http://nationalefficiencyscreening.org/wp-content/uploads/2017/05/NSPM_May-2017_final.pdf). Page 58: Societal Low-Income Impacts.

low-income programs to incorporate these additional benefits. For example, Vermont uses the societal cost test as its primary test and incorporates a 15% adder for nonenergy benefits for low-income customers in its cost-effectiveness screening tool. Similarly, Colorado uses the total resource cost test and includes a 50% adder to account for the benefits from low-income programs.

### Renewables and workforce

**Integrate energy efficiency and solar** program offerings to maximize participant benefits. To do this, combined renewable and energy efficiency programs should first invest in energy efficiency to reduce the home's overall energy needs, and then invest in renewable energy so that individual households can install the right size solar system or many households can access community solar options. For example, the Connecticut Green Bank collaborates with PosiGen, a private company, to deliver both solar and energy efficiency to low-income customers. The Green Bank helps PosiGen generate capital to provide 20-year solar leases combined with energy

efficiency upgrades to program participants, leading to the most cost-effective investment.<sup>35</sup>

**Support the development of a diverse and strong energy efficiency workforce** that represents the local community. Ensure that training opportunities are linked to high-quality, well-paid, and stable careers in the energy efficiency and clean energy workforce sector. States and local governments, utilities, and other program implementers can focus on diversifying suppliers, increasing the worker pipeline by offering training for both contracting firms and students, and partnering with skills-training providers and state agencies—all while working to overcome barriers faced by historically excluded community members. Implementers can also co-deliver training for energy efficiency and renewable energy technologies. For example, the Chicago-based nonprofit Elevate Energy coordinates a Clean Energy Jobs Accelerator that trains individuals from economically excluded communities for careers in solar and energy efficiency.

<sup>35</sup> EDF (Environmental Defense Fund) and APPRISE (Applied Public Policy Research Institute for Study and Evaluation). 2018. Low-Income Energy Efficiency. New York. [www.edf.org/sites/default/files/documents/liee\\_national\\_summary.pdf](http://www.edf.org/sites/default/files/documents/liee_national_summary.pdf).





529 14th Street NW, Suite 600, Washington, DC 20045  
(202) 507-4000 |  @ACEEEDC |  @myACEEE | [aceee.org](http://aceee.org)

