A FUEL ASSISTANCE TRACKING MECHANISM:

Measuring the Impact of Changes in Weather and Prices
On the Bill Payment Coverage Capacity of LIHEAP

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Introduction

The Low-Income Home Energy Assistance Program (LIHEAP)[1] is one of the critical sources of direct federal fuel assistance in the nation today.[2] LIHEAP supplies funding for heating and cooling needs[3] for low-income households.[4] In Program Year (FY) 2012,[5] the basic LIHEAP allocation of $3.472 billion[6] allowed states[7] to provide heating and cooling assistance to roughly 8.9 million households.[8] In addition, the LIHEAP statute allows the President to "release" emergency "emergency" or "contingency" funds[9] if the President finds that any one of several statutorily-prescribed conditions exists.[10]

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[1] 42 U.S.C. §§ 8621 et seq. (2012).

[2] Other substantial sources of energy assistance funding exist. One such source, for example, involves the "utility allowances" provided through the U.S. Department of Housing and Urban Development (HUD) to tenants of public and assisted housing. Similar "utility allowances" are provided to tenants of Low-Income Housing Tax Credit (LIHTC) developments, federal HOME (rental) developments, and related affordable housing programs. Unlike LIHEAP, these "utility allowances" are not restricted to heating and cooling costs; moreover, they are intended to cover the ***entire*** utility bill of affected tenants. Another source of federal energy assistance is through the Food Stamp (now referred to as the Supplemental Nutrition Assistance Program, SNAP) program's "excess shelter deduction." Through the Excess Shelter Deduction, the Food Stamp program provides an "income disregard" for shelter costs exceeding 50% of income subject to specific limitations not relevant here. "Shelter costs" for purposes of the Excess Shelter Deduction include all utilities, including telephone service.

[3] The LIHEAP statute refers to "home energy needs," but defines that term to encompass only home heating and cooling consumption. 42 U.S.C. § 8622(6) (2012) ("The term 'home energy' means a source of heating or cooling in residential dwellings.")

[4] Income eligibility for LIHEAP is within the discretion of the state, so long as minimum income eligibility is not set below 110% of the Federal Poverty Level and maximum income eligibility is not set above 150% of Federal Poverty Level or 60% of state median income, whichever is greater. 42 U.S.C. §8624(b)(2)(B) (2012). Moreover, specified groups of customers are categorically eligible for LIHEAP based on their participation in other public assistance programs. 42 U.S.C. §8624(b)(2)(A) (2012). Categorical eligibility extends to those receiving assistance from the Supplemental Nutrition Assistance Program (SNAP) (formerly Food Stamps), Supplemental Security Income (SSI), specified Veterans' Assistance programs, and specified components of Social Security.

[5] The LIHEAP "program year" runs coincident with the federal Fiscal Year. The 2011 program year began in October 2010 and continued through September 2011.

[6] The original LIHEAP appropriation of $3,478,246,000 was made subject to a "rescission" of 0.189%, yielding a final appropriation of $3,471,672,115. See, http://liheap.ncat.org/Funding/funding.htm (last accessed August 30, 2012).

[7] References to "states" throughout this paper include the District of Columbia but exclude territories.

[8] A March 20, 2012 letter signed by 137 members of the U.S. House of Representatives stated: "according to the National Energy Assistance Directors Association (NEADA), approximately 8.9 million families nationwide received LIHEAP heating assistance last winter, an increase of 16% from two years ago." A similar letter (March 29, 2012), signed by 43 U.S. Senators, cited NEADA for the proposition that: "in 2011, LIHEAP provided vital energy assistance to 8.9 million households, an increase of 54 percent since 2008."

[9] The LIHEAP statute provides that: "There is authorized to be appropriated in each fiscal year for payments under this title, in addition to amounts appropriated for distribution to all the States in accordance with section 2604 (other than subsection (e) of such section), $600,000,000 to meet the additional home energy assistance needs of one or more States arising from a natural disaster or other emergency." 42 U.S.C. §8621(e) (2012).

[10] Under the statute (42 U.S.C. §8622(1) (2012)), "The term "emergency" means--

(A) a natural disaster;

(B) a significant home energy supply shortage or disruption;

The amount of LIHEAP contingency funds available to be released each year is set in the LIHEAP appropriation. Once the available contingency funding amount is established by Congress in any given year, the President is authorized to release none, some or all of it.[11] In making contingency releases, the President may authorize releases to a limited number of states, depending upon the underlying findings giving rise to the release.[12] In Fiscal Years 2008 through 2012, for example, the LIHEAP contingency funding history shows a frequent targeting of contingency releases.

History of LIHEAP Contingency Releases to States: Program Years 2008 – 2012		
Date of Release	Contingency Release to States	States Targeted to Receive Contingency Release
January 16, 2008	$445,367,527	All
February 22, 2008	$40,000,000	11 states with record high fuel oil prices
September 17, 2008	$96,000,000	All
September 17, 2008	$25,000,000	7 states where 30% or more of low-income households heat with fuel oil.
October 16, 2008	$582,229,881	All
October 16, 2008	$100,000,000	7 states where 30% or more of low-income households heat with fuel oil.
January 24, 2011	$199,779,053	All
SOURCE: LIHEAP Clearinghouse, http://liheap.ncat.org/Funding/emrgfund.htm		

(C) a significant increase in the cost of home energy, as determined by the Secretary;

(D) a significant increase in home energy disconnections reported by a utility, a State regulatory agency, or another agency with necessary data;

(E) a significant increase in participation in a public benefit program such as the food stamp program carried out under the Food Stamp Act of 1977 (7 U.S.C. 2011 et seq.), the national program to provide supplemental security income carried out under title XVI of the Social Security Act (42 U.S.C. 1381 et seq.) or the State temporary assistance for needy families program carried out under part A of title IV of the Social Security Act (42 U.S.C. 601 et seq.), as determined by the head of the appropriate Federal agency;

(F) a significant increase in unemployment, layoffs, or the number of households with an individual applying for unemployment benefits, as determined by the Secretary of Labor; or

(G) an event meeting such criteria as the Secretary, in the discretion of the Secretary, may determine to be appropriate."

[11] See, 42 U.S.C. §8621(e) (2012). ("Such funds shall be made available only after the submission to Congress of a formal budget request by the President (for all or a part of the appropriation pursuant to this subsection) that includes a designation of the amount requested as an emergency requirement as defined in such Act.")

[12] See, for example, the contingency releases listed in the Table for February 22, 2008, September 17, 2008, and October 16, 2008 (releases specific to states facing substantial fuel oil price increases).

In a very minor way, the LIHEAP contingency fund is somewhat of a buffer against LIHEAP's status as a "block grant" program. As a block grant program,[13] Congress allocates a fixed sum of LIHEAP funding to each state each year. When funding from that allocation is exhausted,[14] the distribution of benefits ceases, unrelated to the number of current or pending applicants or to the date during the Program Year at which the funding is exhausted. Funding for a block grant program, in other words, does not increase merely because the "need" goes up, either in terms of the number of applicants[15] or the level of the underlying home energy bills to be addressed by the program.[16]

This paper presents a mechanism to track the compounded impact of fuel prices and weather on the adequacy of LIHEAP in any given year. This Fuel Assistance Tracking Mechanism (FATM) could be a useful tool in deciding whether and to what extent the release and distribution of LIHEAP contingency funds is merited. Based upon an examination of the level of regional home heating and cooling bills,[17] as affected by fuel prices and weather,[18] this paper assesses whether states might have a need for the release of LIHEAP contingency funds on a "hold-harmless" basis. To the extent that the confluence of changes (colder or warmer) in regional prices and/or temperatures would dilute the ability of LIHEAP to serve households on an average-bill basis,[19] in other words, LIHEAP contingency funds would be released and distributed on a pro rata basis so as to allow states to serve the same number of households as

[13] "In the late 1970s, the Advisory Commission on Intergovernmental Relations (ACIR) developed a list of characteristics of block grants, saying, 'a block grant may be defined as a program by which funds are provided chiefly to general purpose governmental units in accordance with a statutory formula for use in a broad functional area, largely at the recipient's discretion.'" Margy Waller (December 2005). "Block Grants: Flexibility vs. Stability in Social Services," The Brookings Institution, Center on Children and Families, Policy Brief #34, Washington D.C. According to Waller, "[p]roposals to block grant programs that previously guaranteed benefits to individuals who met a set of defined qualifications (called entitlements) present special issues because shifting from the guarantee to fixed funding ends the individual entitlement, as occurred with the welfare legislation in 1996." Id.

[14] States may, by design, carry-forward funding to a future year. 42 U.S.C. §8626(b)(2)(A) (2012). ("Any State may request that an amount allotted to such State for a fiscal year be held available for such State for the following fiscal year. Such request shall include a statement of the reasons that the amount allotted to such State for a fiscal year will not be used by such State during such fiscal year and a description of the types of assistance to be provided with the amount held available for the following fiscal year. Any amount so held available for the following fiscal year shall not be taken into account in computing the allotment of or the amount payable to such State for such fiscal year under this title.") Any carry-forward is limited to 10% of the State's LIHEAP allocation. Id.

[15] For example, a bad economy might well increase the number of LIHEAP applicants in any given year.

[16] Home energy bills might increase due to weather (e.g., a very cold winter or a very hot summer) or due to spikes in underlying fuel prices.

[17] "Regions" for purpose of this paper are based on "Census divisions." The United States is divided into four "Census Regions" and nine "Census divisions." For a map of the Census Regions and Census Divisions by state, see, https://www.census.gov/geo/www/us_regdiv.pdf (last accessed September 26, 2012).

[18] For purposes of this paper, "weather" is measured in terms of Heating Degree Days (HDDs) and Cooling Degree Days (CDDs).

[19] Frequently, but not always, the combination of price and weather changes would result in a dilution of the ability of LIHEAP to meet home energy needs. However, the factors of price and weather might alternatively offset each other. In a year of extreme temperatures, prices could be somewhat lower. More likely, however, in a year of price spikes, temperatures might be colder-than-normal in the winter or warmer-than-normal in the summer.

would be served under a base case. An explanation of the design and operation of the FATM is set forth in more detail below.

The purpose of the Fuel Assistance Tracking Mechanism (FATM) is to assess the impact of changes in heating and cooling prices, in combination with changes in weather, on the "bill payment coverage capacity" of federal LIHEAP dollars. For purposes of the FATM, the "bill payment coverage capacity" of LIHEAP is measured by the number of average annual heating and cooling bills[20] "covered" by a region's LIHEAP allocation.[21] The FATM coverage capacity is measured in "number of bills."[22] It is calculated by dividing a region's annual basic LIHEAP allocation[23] by the annual combined heating/cooling bills,[24] set forth in dollars.

The FATM is calculated using heating and cooling as separate components of a total annual heating/cooling bill.

- The FATM (heating) (FATM-H) is calculated primarily to reflect winter temperatures and fuel prices. Two factors drive the calculation of the FATM-H: (1) the cumulative heating degree days (HDDs) for the months of October through March of the program year; and (2) the month-by-month prices for the four major heating fuels.[25]

- The FATM (cooling) (FATM-C) is separately calculated to incorporate changes in summer temperatures and fuel prices. The seasonal equivalent of the same two factors drives the calculation of the FATM-C: (1) the cumulative cooling degree days (CDDs) for the months of June through August of the program year; and (2) the month-by-month price of electricity for each month of the cooling season.

Part 1. Methodology

The purpose of this inquiry is to assess the extent to which, if at all, changes in monthly temperatures and fuel prices affect the ability of LIHEAP to serve the same number of customers as served by a base appropriation at "normal" temperatures in a Base Year. For purposes of this paper, Program Year 2008 (2007 – 2008) was used as the Base Year.[26] The five "Comparison Scenarios" used in this inquiry involve price and temperature data from two years before and three years after the "base":

[20] The FATM does not consider total residential bills, but simply heating and cooling bills.
[21] The number of heating and cooling bills is determined on a state-by-state basis and then aggregated into a regional number.
[22] If a region's LIHEAP allocation were $1,000, and the average annual heating/cooling bill were $200, the bill payment coverage capacity would be five (5) bills ($1,000 / $200/bill = 5 bills covered).
[23] The "basic" LIHEAP allocation excludes any contingency funds as well as all supplemental appropriations.
[24] The analysis excludes bills for domestic hot water usage as well as electric appliance consumption (including refrigerators and lights).
[25] The four major heating fuels are defined to include electricity, natural gas, fuel oil and propane.
[26] The importance of the "Base Year" is that base fuel prices were set at Base Year levels.

- Program Year 2006 (October 2005 through September 2006) (Comparison Scenario 1);
- Program Year 2007 (October 2006 through September 2007) (Comparison Scenario 2);
- Program Year 2009 (October 2008 through September 2009) (Comparison Scenario 3);
- Program Year 2010 (October 2009 through September 2010) (Comparison Scenario 4); and
- Program Year 2011 (October 2010 through September 2011) (Comparison Scenario 5).[27]

The Program Year is defined, for both the Base Year and for each Comparison Scenario, as running from October through September.[28] Within each year:

- Normal heating degree days (HDDs) and Cooling Degree Days (CDDs) were those reported by the National Weather Service's Climate Prediction Center (NWS/CPC).

- HDDs were weighted by penetration of heating fuels other than propane as directly reported for each Census Division by the NWS/CPC.[29]

- The "heating season" was defined as the months of October through March. The "cooling season" was defined as the months of June through August. All states were deemed to have both a "heating season" and a "cooling season" for which HDDs and CDDs were taken into account.

- Price data was obtained by month from the Energy Information Administration (EIA) of the U.S. Department of Energy (DOE) and weighted by total monthly residential consumption for each respective fuel in each respective month.[30]

- Base Census Division data, including fuel penetrations, housing unit size, and energy use intensities, was taken from the 2005 Residential Energy Consumption Survey (RECS) published by the Energy Information Administration of the DOE.

Temperature and price data was obtained on a state-by-state basis. The number of bills calculated using that data were aggregated into Census Divisions and divided into the total

[27] Using Program Year 2008 as the Base Year allowed the use of years both before and after the Base Year for comparison purposes. This was to eliminate the concern, if any, that fuel prices might exhibit a tendency to increase over time, thus resulting in a tendency of the inquiry to find that LIHEAP underserves the population based on normal escalations (rather than based on temporary fluctuations) in fuel prices.
[28] The LIHEAP "program year," in other words, is coincident with the federal fiscal year.
[29] In the absence of weighted propane HDDs reported by the NWS/CPC, total regional HDDs, not weighted by heating fuel penetration, were used for propane.
[30] Where individual state fuel oil and/or propane prices were not available, PAAD prices were assigned to each state within the respective PADDs. "PADDs" are the Petroleum Administration Defense Districts (PADDs). The United States is divided into five (5) PADDs (East Coast, Midwest, Gulf Coast, Rocky Mountain West Coast). In turn, PADD I (East Coast) is divided into three "sub-districts" (New England, Central Atlantic, Lower Atlantic). See, Energy Information Administration (EIA) for a state-by-state assignment to PADDs. www.eia.gov/gasdiesel/ (last accessed September 24, 2012).

LIHEAP allocation to all states in each Census Division. The Census Divisions by state are set forth in the Table below:

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

After calculating the number of "average bills" which the allocation of LIHEAP[31] would cover in each Census Division for the Base Year, each State's average bill was recalculated using actual fuel prices, HDDs and CDDs for the five Comparison Scenarios. The number of these adjusted bills that the base LIHEAP allocation would "cover" was then calculated to determine whether that base LIHEAP allocation would cover a greater or lesser number of bills under the Comparison Scenarios. In those instances where LIHEAP would cover fewer bills, the amount of additional LIHEAP that would have been required to maintain the same number of bills covered (referred to as the "bill payment coverage capacity") was determined. Reallocation of LIHEAP funding between Census Divisions did not occur.

The inquiry does not consider the number of actual applications for LIHEAP assistance. Instead, the inquiry examines only the average bills (in dollars) in each Comparison Scenario as driven by the temperatures and fuel prices that existed in the Program Years comprising that Scenario. The fact that higher or lower prices, as well as warmer or colder temperatures, might affect the actual number of applications was not a relevant factor. The inquiry instead is to assess the *capacity* of LIHEAP to cover average heating and cooling bills year given changes in bills reflecting fluctuations in fuel prices and temperatures.

Nor were actual annual LIHEAP appropriations examined in any given year. The point of the year-by-year analysis is not to assess the extent to which actual LIHEAP funding met some level

[31] LIHEAP was allocated based on the federally-prescribed formula and aggregated into Census Division by summing the states within each Census Division.

of "need" in any given year. Rather, the point of the analysis is to consider the extent to which, if at all, changes in fuel prices and temperatures would affect the distribution of LIHEAP in a Base Year. The Program Years reflected in the various Comparison Scenarios, in other words, are used only for the purpose of providing alternative temperature and fuel price scenarios grounded in real world, rather than hypothetical or assumed, data. The Comparison Scenarios are then applied to the Base Year appropriation to determine the impact on how many low-income "bills" could have been covered using the prices and temperatures reflected in those Comparison Scenarios.[32]

Part 2. The Bill Payment Coverage Capacity of LIHEAP.

The bill payment coverage capacity of LIHEAP for purposes of this analysis is calculated using Program Year 2008 as the "Base Year." The Base Year is used to set fuel prices. Heating fuel prices are those prices that existed in the months of October through March of the Base Year. Cooling prices are the electricity prices for June through August of the Base Year. Heating and cooling bills were calculated using state-specific "normal" temperatures in each heating and cooling month as reported by the National Climate Prediction Center.

Given these billing inputs, the Base Year LIHEAP appropriation was sufficient to cover 5.8 million heating and cooling bills nationwide. The number of bills covered varied widely by Census Division, from a high of 1.084 million bills in the East North Central Census Division to a low of 325,000 bills in the East South Central Division. The South Atlantic (993,288 bills), Pacific (908,846 bills) and Mid-Atlantic (834,247 bills) Divisions were the regions with the next largest LIHEAP bill payment coverage capacity.[33]

The relative LIHEAP bill payment coverage capacity by region does not necessarily follow the absolute dollar amount of LIHEAP allocated to any given geographic region. For example, as shown in the Table immediately below, while the Mid-Atlantic Division had the highest LIHEAP allocation, because it also had somewhat higher heating and cooling bills, it had only the fourth highest bill payment coverage capacity. While the Pacific Division had only the sixth highest LIHEAP allocation, because it had somewhat lower heating and cooling bills, it had the third highest bill payment coverage capacity. While New England had the fifth highest LIHEAP allocation, it had the eighth highest bill payment coverage capacity. Moreover, the LIHEAP bill

[32] To illustrate, consider that the Base Year was set as Program Year 2008. This analysis calculated the bill payment coverage capacity of the 2008 LIHEAP appropriation using the prices and temperatures that existed in PY2008. The analysis then alternatively recalculates the bill payment coverage capacity of the 2008 LIHEAP appropriation by looking at what that capacity would have been had prices and temperatures instead been at PY2009 levels (Comparison Scenario 3). It alternatively examines what the 2008 LIHEAP bill payment coverage capacity would have been had the prices and temperatures instead been at PY2010 levels (Comparison Scenario 4). By looking at various Comparison Scenarios, it is possible to determine the sensitivity of the LIHEAP appropriations to changes in prices and/or temperatures.

[33] The LIHEAP bill payment coverage capacity calculated is the ability of LIHEAP to cover the average combined heating and cooling bills. It may or may not reflect actual LIHEAP participation levels.

payment coverage capacity does not take into account "need" in any sense. It instead is an arithmetical calculation, spreading the LIHEAP appropriation over average heating and cooling bills.[34]

Base Year LIHEAP Allocations and Bill Payment Coverage Capacity (Base Year = Program Year 2007/2008)						
Census Division	LIHEAP Allocation		Average Annual Heating/Cooling Bill		Number of Bills Covered	
	Dollars	Rank	Dollars	Rank	Bills	Rank
New England	$321,070,242	5	$913	1	351,703	8
Mid Atlantic	$733,960,604	1	$880	2	834,247	4
South Atlantic	$443,636,130	3	$453	8	993,288	2
East South Central	$180,826,460	8	$557	5	324,597	9
West South Central	$237,885,354	7	$529	6	449,876	6
East North Central	$709,7764,101	2	$655	3	1,084,208	1
West North Central	$349,778,950	4	$647	4	540,745	5
Mountain	$178,476,520	9	$491	7	363,206	7
Pacific	$275,659,330	6	$303	9	908,846	3
United States Total	$3,437,067,751	---	---	---	5,850,716	---

The discussion below presents an examination of the changes in the bill payment coverage capacity of federal LIHEAP appropriations in the Base Year (2008) given actual temperatures and prices in five Comparison Scenarios using actual prices and temperatures from different years (2006, 2007, 2009, 2010, 2011). The combined influence of temperatures and prices might generate one of three alternative impacts:

- To the extent that more extreme temperatures correspond with increases in prices, the combined impact would be to compound the dilution of LIHEAP's capacity to serve households. Standing alone, either more extreme temperatures[35] or increases in prices would drive bills higher, thus making a constant appropriation unable to serve the same number of households. The two factors occurring coincidentally would compound the effects of each other.

[34] The bill payment coverage capacity also does not take into account any other uses for LIHEAP, including the transfer of some portion of LIHEAP to weatherization, the distribution of LIHEAP "crisis" grants, the need to use some portion of LIHEAP for administrative purposes, or the use of some portion of LIHEAP for leveraging or Assurance 16 services.

[35] The term "more extreme temperatures" refers to colder-than-normal winters or hotter-than-normal summers.

- The converse is true as well. To the extent that less extreme temperatures[36] correspond with decreases in prices, the compounded effect would be to drive bills down, thus allowing LIHEAP to increase its bill payment coverage capacity.

- Finally, changes in prices and temperatures might well cancel the impact of each other out in whole or part. High winter heating fuel prices might correspond with warmer-than-normal winter temperatures, thus mitigating the bill escalation impact that would otherwise be expected to occur. Similarly, a hot summer coupled with lower-than-normal electricity prices might result in mitigated bill impacts, with the temperature-induced bill increases offset by the price-induced bill decreases.

The discussion below uses the FATM to measure these impacts given actual state and regional prices and temperatures over a multi-year period compared to a constant Base Year LIHEAP allocation to each Census Division.

LIHEAP Bill Payment Coverage Capacity Based on Changes in Prices and Temperatures.

A clear demarcation of geographic areas in the United States have been subject to the vagaries of changes in fuel prices and temperatures on a seasonal basis in the six-year period 2006 through 2011. The nine Census Divisions demonstrated noticeably different sensitivity to changes in temperatures and fuel prices as measured by the FATM. The 2007-2008 LIHEAP appropriation is deemed to be the "Base Year." The five alternative years are defined to be the Comparison Scenarios.

East North Central Division

The East North Central Division shows the greatest regional sensitivity for the compounded impacts of price and temperature in the first three Comparison Scenarios (PY2006, PY2007, PY2009). Overall, using prices and temperatures from five Comparison Scenarios, the East North Central Division experienced a bill payment coverage capacity shortfall in two of the five Comparison Scenarios (when compared to the Base Year of 2007/2008). For example, Comparison Scenario 1 (using Program Year 2006 data) shows that the region would have failed to cover 32,688 bills given the fuel prices and weather experienced during that program year.[37] The East North Central Division would have required a hold-harmless appropriation of more than $22 million in the Base Year using the prices and temperatures actually experienced in PY2006.

While experience under the Program Year 2009 Comparison Scenario would have been somewhat better, the East North Central Division nonetheless would still have experienced a

[36] The term "less extreme temperatures" refers to warmer-than-normal winters or cooler-than-normal summers.
[37] 2008 base bill coverage: 1,084,208 bills; 2006 bill coverage: 1,051,520 bills.

substantial shortfall, failing to cover 21,112 bills coupled with a $14.1 million hold-harmless appropriations requirement.[38] The "hold-harmless appropriation needed" represents that amount of additional appropriation in the Base Year that would have been required to serve the same number of households as were actually served, but instead using the Comparison Scenario prices and temperatures as bill inputs.

The multiplier data presented in Appendix A (heating months) and Appendix B (cooling months)[39] shows that in Program Year 2006, the East North Central Division experienced price increases for every heating fuel, topped by natural gas price escalations of nearly 18% and electricity price escalations of more than three percent (3%).[40] The impact that the higher heating fuel prices would have had on low-income households would have been mitigated by the relatively modest weather in PY2006. Heating Degree Days (HDDs) were ten percent (10%) or more below normal during that high-cost heating season.

In contrast, cooling needs did not contribute substantially to the shortfall found using the 2006 Comparison Scenario price and temperature data. At the same time that cooling needs (measured by Cooling Degree Days) increased by 10% relative to "normal" temperatures, electricity prices during the cooling months were down by more than 12% (relative to the Base Year).

[38] 2008 base bill coverage: 1,084,208 bills; 2009 bill coverage: 1,063,096 bills.

[39] The "price multiplier data" sets forth the ratio of the prices in each Comparison Scenario to the prices in the Base Year. The "degree-day multiplier data" sets forth the ratio of the Cooling Degree Days (CDDs) and Heating Degree Days (HDDs) in each Comparison Scenario to the CDDs and HDDs in the Base Year. If the price multiplier is less than 1.0, the Comparison Scenario had lower prices; if the price multiplier is greater than 1.0, the Comparison Scenario had higher prices. If the HDD multiplier is greater than 1.0, the winter temperatures were colder-than-normal (and vice versa). If the CDD multiplier is greater than 1.0, the summer temperatures were warmer-than-normal (and vice versa).

[40] Fuel oil prices in the 2006 Comparison Scenario were more than 40% greater than in the Base Year, but fuel oil is the primary heating fuel for only three percent (3%) of the East North Central population.

LIHEAP "Hold-harmless" Needs Given Actual Temperatures and Fuel Prices: East North Central Division					
Comparison Scenario	Base Year Allocation	Base No. of Bills Covered	Bills Covered at Year's Price and Temps	Bill Coverage Shortfall	Hold-harmless Appropriation Need /a/
#1: PY2005 – 2006	$709,774,101	1,084,208	1,051,520	32,688	$22,064,339
#2: PY2006 – 2007			1,183,918	0	$0
#3: PY2008 – 2009			1,063,096	21,112	$14,095,390
#4: PY2009 – 2010			1,177,129	0	$0
#5: PY2010 – 2011			1,255,043	0	$0
/a/ The "hold-harmless" appropriation is that appropriation needed to allow the Census Division to meet increases in LIHEAP need based on temperature and fuel prices in the Comparison Scenario. If no "bill payment coverage capacity shortfall" exists, the "hold-harmless" appropriation is set equal to $0.					

In contrast to the PY2006 Comparison Scenario, the shortfalls in the PY2009 Comparison Scenario resulted from the compounded effects of prices and temperature. For example, the extent to which natural gas prices in the PY2009 Comparison Scenario exceeded the Base Year prices was more modest (1.3%), but the higher gas prices were accompanied by a nearly three percent increase in Heating Degree Days. Similarly, electric heating prices were only slightly higher in PY2009, but were accompanied by colder winter weather, thus creating a bill payment shortfall.

West North Central Division

The West North Central Division would not have experienced a bill payment coverage shortfall under any of the five Comparison Scenarios relative to the home energy needs in the Base Year. On a base number of 541,000 bills that LIHEAP covered in PY2008, changes in prices and temperatures in the five Comparison Scenarios would have allowed the West North Central Division to cover from a low of 544,000 bills (PY2006) to a high of more than 605,000 bills (PY2007).

In PY2006, the West North Central Division experienced an increase in natural gas prices (akin to the East North Central Division), but had slightly warmer winter temperatures relative to normal temperatures. Moreover, as the price and temperature multipliers set forth in Appendix A show, electric prices in the West North Central Division were lower in PY2006 than in the Base Year (coupled, again, with warmer-than-normal winter month temperatures).

The temperature deviations from the norm would have been sufficient in the West North Central Division in the Comparison Scenarios to prevent a LIHEAP bill payment coverage shortfall, even given the relatively higher heating fuel prices. The experience of the West North Central Division demonstrates that it cannot be assumed that merely because heating fuel prices increase, the LIHEAP bill payment coverage capacity decreases as a result.

LIHEAP "Hold-harmless" Needs Given Actual Temperatures and Fuel Prices: West North Central Division					
Comparison Scenario	Base Year Allocation	Base No. of Bills Covered	Bills Covered at Year's Price and Temps	Bill Coverage Shortfall	Hold-harmless Appropriation Need /a/
#1: PY2005 – 2006	$349,778,950	540,745	543,986	0	$0
#2: PY2006 – 2007			605,356	0	$0
#3: PY2008 – 2009			570,283	0	$0
#4: PY2009 – 2010			572,445	0	$0
#5: PY2010 – 2011			554,168	0	$0
/a/ The "hold-harmless" appropriation is that appropriation needed to allow the Census Division to meet increases in LIHEAP need based on temperature and fuel prices in the Comparison Scenario. If no "bill payment coverage capacity shortfall" exists, the "hold-harmless" appropriation is set equal to $0.					

Mountain Division

The Mountain Census Division would have experienced a LIHEAP bill payment coverage capacity shortfall under price and temperature scenarios actually experienced in two of the five Comparison Scenarios. Because of population differences, however, the magnitude of the financial shortfall, as well as the number of bills that the Base Year's fuel assistance appropriation could not cover under the Comparison Scenarios, was much smaller in absolute terms than in the East North Central Division.

Using Program Year 2006 prices and temperatures (Comparison Scenario 1), the Mountain Census Division would have fallen modestly short in the number of heating/cooling bills that LIHEAP was capable of covering. With a bill payment coverage capacity shortfall of 9,456 bills, the Mountain Division would have required an additional $4.8 million to meet the changes in benefits required to hold states in the Mountain Division harmless against variations in temperatures and fuel prices.

The Mountain Division would have experienced a similar shortfall using price and temperature data from Comparison Scenario 4 (PY2010). Price and temperature changes in Program Year 2010 would have resulted in a bill payment coverage capacity shortfall of 10,196 bills with a hold-harmless appropriation need of roughly $5.2 million.

Comparison Scenario 1 (PY2006) in the Mountain Division followed much the same pattern as was found in the East North Central Division. Natural gas prices were substantially greater in PY2006 than in the Base Year, mitigated somewhat by warmer-than-normal winter weather (as evidenced by fewer HDDs). Winter electricity prices were stable while LPG prices were modestly higher. The Mountain Division also experienced a significantly warmer-than-normal summer season (with Cooling Degree Days being nearly 27% higher than normal) contributing to the PY2006 payment coverage shortfall.

In contrast, natural gas prices were virtually unchanged in Comparison Scenario 4 (PY2010), but electricity prices (both during the heating season and the cooling season) were noticeably higher. Higher 2010 LPG prices in the winter months, along with higher summer electric prices contributed to the Comparison Scenario 4 shortfall. These higher prices in the Mountain Division were compounded in each instance by colder than normal winter temperatures and warmer-than-normal summer temperatures to contribute to the overall bill payment coverage capacity shortfall.

LIHEAP "Hold-harmless" Needs Given Actual Temperatures and Fuel Prices: Mountain Division					
Comparison Scenario	Base Year Allocation	Base No. of Bills Covered	Bills Covered at Year's Price and Temps	Bill Coverage Shortfall	Hold-harmless Appropriation Need /a/
#1: PY2005 – 2006	$178,476,520	363,206	353,750	9,456	$4,770,804
#2: PY2006 – 2007			373,946	0	$0
#3: PY2008 – 2009			377,470	0	$0
#4: PY2009 – 2010			353,010	10,196	$5,154,950
#5: PY2010 – 2011			368,178	0	$0
/a/ The "hold-harmless" appropriation is that appropriation needed to allow the Census Division to meet increases in LIHEAP need based on temperature and fuel prices in the Comparison Scenario. If no "bill payment coverage capacity shortfall" exists, the "hold-harmless" appropriation is set equal to $0.					

Pacific Division

The Pacific Division would have experienced a bill payment coverage capacity shortfall only in Comparison Scenario 1 (PY2006) (relative to the 2008 Base Year). The Pacific Division would have experienced a payment coverage capacity shortfall of 14,864 bills using the price and temperatures actually experienced in Comparison Scenario 1 (PY2006). That shortfall would have generated a $4.6 million hold-harmless appropriations need given PY2006 prices and temperatures.

While the Pacific Division demonstrates a bill payment coverage capacity shortfall (and hold-harmless appropriations need) somewhat similar to the Mountain Division (Pacific Division shortfall of 14,864 bills vs. Mountain Division bill payment coverage capacity shortfall of 9,456), the *relative* shortfall in the Pacific Division is much smaller. The Pacific Division shortfall of 14,864 bills is on a base coverage of nearly 910,000 bills, while the Mountain Division shortfall of 9,456 is on a base coverage of only 363,000 bills. The Pacific Division hold-harmless appropriations need of $4.6 million is on a LIHEAP allocation of $276 million, compared to the Mountain Division hold-harmless appropriations need of $4.8 million on a LIHEAP allocation of $178 million. One lesson to be learned from the Pacific Division's Comparison Scenario 1 (PY2006) shortfall is the difference between absolute shortfalls and relative shortfalls.

The Pacific Division shortfall using Comparison Scenario 1 data (PY2006) appears to be driven primarily by increased electricity prices in both the winter heating and summer cooling months, coupled with increased natural gas prices. The impacts of increased summer electric prices in the Pacific Division in PY2006 were compounded because the Pacific Division, as with the remainder of the country, experienced a substantially hotter summer season that year.

LIHEAP "Hold-harmless" Needs Given Actual Temperatures and Fuel Prices: Pacific Division					
Comparison Scenario	Base Year Allocation	Base No. of Bills Covered	Bills Covered at Year's Price and Temps	Bill Coverage Shortfall	Hold-harmless Appropriation Need /a/
#1: PY2005 – 2006	$275,659,330	908,846	893,982	14,864	$4,583,314
#2: PY2006 – 2007			955,641	0	$0
#3: PY2008 – 2009			960,800	0	$0
#4: PY2009 – 2010			1,004,272	0	$0
#5: PY2010 – 2011			966,035	0	$0
/a/ The "hold-harmless" appropriation is that appropriation needed to allow the Census Division to meet increases in LIHEAP need based on temperature and fuel prices in the Comparison Scenario. If no "bill payment coverage capacity shortfall" exists, the "hold-harmless" appropriation is set equal to $0.					

New England Division

The New England Census Division did not show substantial exposure to changes in prices and temperatures using the 2008 program year as the Base Year and a five year period preceding and succeeding that base period as the Comparison Scenarios. Federal LIHEAP dollars would have been sufficient to cover 351,703 heating and cooling bills in New England in the 2008 base period. Holding the LIHEAP appropriation constant, and varying prices and temperatures as actually experienced in the five Comparison Scenarios, that appropriation would have covered no fewer bills using price and temperature data from any of the comparison Program Years. Compared to the 351,703 Base Year bills, New England's LIHEAP allocation would have covered from a low of 359,293 bills (PY2011) to a high of 442,259 bills (PY2007).

New England's lack of any bill payment coverage capacity shortfall appears to be largely driven by a spike in fuel oil prices during the PY2008 Base Year. Compared to the Base Year (PY2008), for example, the fuel oil price multiplier was 0.7319 in PY2006, 0.7229 in PY2007 and 0.7427 in PY2009 (showing fuel oil prices in the Comparison Scenarios of one-quarter or more below what fuel oil prices were in the PY2008 Base Year). Similarly, natural gas prices in New England were noticeably lower in PY20010 and PY2011 relative to the PY2008 Base Year. Lower electric cooling prices in New England (relative to the PY2008 Base Year) tended to contribute to the lack of a bill payment coverage shortfall (even though these lower electric cooling prices were offset by substantially warmer-than-normal summers in PY2006, PY2010 and PY2011).

The New England data demonstrates how important it is to choose a representative Base Year. High fuel oil prices in PY20008, for example, had an ongoing influence over the assessment of the extent to which changes in home heating prices increased or decreased LIHEAP's bill payment coverage capacity in the Comparison Scenarios. However, the New England data further demonstrates the difficulty in selecting a representative Base Year. Despite New England fuel oil prices in the PY2008 Base Year, electric prices (as well as natural gas prices) in PY2008 seemed to be most representative in that year.[41]

LIHEAP "Hold-harmless" Needs Given Actual Temperatures and Fuel Prices: New England Division					
Comparison Scenario	Base Year Allocation	Base No. of Bills Covered	Bills Covered at Year's Price and Temps	Bill Coverage Shortfall	Hold-harmless Appropriation Need /a/
#1: PY2005 – 2006	$321,070,242	351,703	422,129	0	$0
#2: PY2006 – 2007			442,259	0	$0
#3: PY2008 – 2009			404,593	0	$0
#4: PY2009 – 2010			422,022	0	$0
#5: PY2010 – 2011			359,293	0	$0
/a/ The "hold-harmless" appropriation is that appropriation needed to allow the Census Division to meet increases in LIHEAP need based on temperature and fuel prices in the Comparison Scenario. If no "bill payment coverage capacity shortfall" exists, the "hold-harmless" appropriation is set equal to $0.					

Mid-Atlantic Division

Similar to New England, changes in prices and temperatures in the Mid-Atlantic Census Division did not generate bill payment coverage capacity shortfalls in the Mid-Atlantic Division (and thus would not have required a hold-harmless appropriation to cover the same number of bills as were covered using the Program Year 2008 Base Year appropriation). Using price and temperature data from the five Comparison Scenarios in the Mid-Atlantic Division would have resulted in the ability to cover a greater number of bills than in the Base Year (PY2008) in each instance. No hold-harmless appropriation would have been needed under these alternative price and temperature scenarios.

Slight increases in natural gas prices (*vis a vis* the PY2008 Base Year) would have been more than offset by warmer-than-normal winter temperatures (with a multiplier less than 1.0). While electric heating month prices were higher in the PY2009, PY2010 and PY2011 Comparison Scenarios (relative to the Base Year), electricity is the primary heating fuel for only 18% of the Mid-Atlantic population. In contrast, fuel oil prices in the Mid-Atlantic Division were substantially lower in the Comparison Scenarios than in the Base Year, coupled with the fact that

[41] New England finally demonstrates the difficulty arising from consideration of aggregated home heating bills rather than fuel-by-fuel heating bills. Changes in New England natural gas prices were offset by changes in New England fuel oil prices. By assessing bill payment coverage capacity on an aggregated basis, it is, in effect, presumed that LIHEAP benefits can be modified to reflect these changing intra-state dynamics by adjusting benefits between, for example, fuel oil and natural gas users. This assumption may or may not be grounded in reality.

fuel oil represents the primary heating fuel for nearly one-quarter of the Mid-Atlantic population. The Mid-Atlantic Division had much warmer-than-normal temperatures in cooling months in four of the five Comparison Scenarios (PY2006, PY2007, PY2010, PY2011), but these temperature variations were offset by electricity prices that were at or below the PY2008 Base Year.

LIHEAP "Hold-harmless" Needs Given Actual Temperatures and Fuel Prices: Mid-Atlantic Division					
Comparison Scenario	Base Year Allocation	Base No. of Bills Covered	Bills Covered at Year's Price and Temps	Bill Coverage Shortfall	Hold-harmless Appropriation Need /a/
#1: PY2005 – 2006	$733,960,664	834,247	908,079	0	$0
#2: PY2006 – 2007			989,023	0	$0
#3: PY2008 – 2009			939,088	0	$0
#4: PY2009 – 2010			950,322	0	$0
#5: PY2010 – 2011			925,018	0	$0
/a/ The "hold-harmless" appropriation is that appropriation needed to allow the Census Division to meet increases in LIHEAP need based on temperature and fuel prices in the Comparison Scenario. If no "bill payment coverage capacity shortfall" exists, the "hold-harmless" appropriation is set equal to $0.					

South Atlantic Division

The South Atlantic Census Division showed the greatest sensitivity to changes in prices and temperatures of any of the nation's nine Census Divisions. Compared to the Base Year (PY2008), the South Atlantic Census Division would have experienced a bill payment coverage capacity shortfall under each of three Comparison Scenarios (PY2009, PY2010, PY2011). On a base bill payment coverage of 993,288 bills, the South Atlantic Division would have experienced a shortfall of more than 117,000 bills using price and temperature data from PY2010, and of nearly 100,000 bills using price and temperature data from PY2011. The hold-harmless appropriation needs for those Comparison Scenarios would have been $60.1 and $50.2 million respectively.

While the bill payment coverage capacity shortfall using PY2009 price and temperature data would have been substantially lower, the South Atlantic Division would nonetheless still have fallen 23,293 bills short on a base bill payment coverage base of 993,288 bills, with a hold-harmless appropriation need of $10.8 million.

The bill payment coverage capacity shortfall experienced by the South Atlantic Division was higher than the remainder of the country both in absolute terms and in terms relative to the Base Year LIHEAP allocation and the number of bills covered by LIHEAP in the PY2008 Base Year.

LIHEAP "Hold-harmless" Needs Given Actual Temperatures and Fuel Prices: South Atlantic Division					
Comparison Scenario	Base Year Allocation	Base No. of Bills Covered	Bills Covered at Year's Price and Temps	Bill Coverage Shortfall	Hold-harmless Appropriation Need /a/
#1: PY2005 – 2006	$449,636,130	993,288	1,046,864	0	$0
#2: PY2006 – 2007			1,116,092	0	$0
#3: PY2008 – 2009			969,995	23,293	$10,797,349
#4: PY2009 – 2010			876,514	117,134	$60,112,365
#5: PY2010 – 2011			893,592	99,696	$50,164,885
/a/ The "hold-harmless" appropriation is that appropriation needed to allow the Census Division to meet increases in LIHEAP need based on temperature and fuel prices in the Comparison Scenario. If no "bill payment coverage capacity shortfall" exists, the "hold-harmless" appropriation is set equal to $0.					

The substantial impacts seen in the South Atlantic Division can be largely attributed to the compounding effects of higher electricity prices for both heating and cooling months in the three relevant Comparison Scenarios along with cooler-than-normal winter temperatures and hotter than normal summer temperatures. Electricity is used as the primary heating fuel in 65% of the homes in the South Atlantic Division. Moreover, the extent of CDDs has a greater impact on overall household energy bills in this southern region of the country.

East South Central Division

As with the South Atlantic Division, the East South Central Division demonstrated amongst the greatest sensitivity of any region in the country to changes in prices and temperatures. The East South Central Division joined the South Atlantic Division as the only two Divisions with a bill payment coverage capacity shortfall in three of the five Comparison Scenarios. On a payment base of roughly 325,000 bills (in the Base Year, PY2008), the East South Central Division experienced a bill payment coverage shortfall of between a low of 8,426 bills using data from Comparison Scenario 3 (PY2009) to a high of 34,631 bills in Comparison Scenario 4 (PY2010). The hold-harmless appropriations needs ranged from a low of $4.8 million to a high of $21.6 million.

While the absolute shortfalls in the East South Central Division are lower than the numbers found for the South Atlantic Division, the relative positions of these two regions of the country are similar. In both Divisions, the highest shortfall was found using prices and temperatures from PY2010 as the Comparison Scenario. While the South Atlantic bill payment coverage capacity shortfall reached 11.8% (117,134 bill shortfall on a base of 993,288 bills), the East South Central shortfall was a comparable 10.7% (34,631 shortfall on a base of 324,597 bills).

LIHEAP "Hold-harmless" Needs Given Actual Temperatures and Fuel Prices: East South Central Division					
Comparison Scenario	Base Year Allocation	Base No. of Bills Covered	Bills Covered at Year's Price and Temps	Bill Coverage Shortfall	Hold-harmless Appropriation Need /a/
#1: PY2005 – 2006	$180,826,460	324,597	326,530	0	$0
#2: PY2006 – 2007			373,125	0	$0
#3: PY2008 – 2009			316,171	8,426	$4,819,044
#4: PY2009 – 2010			289,966	34,631	$21,596,343
#5: PY2010 – 2011			304,347	20,250	$12,031,434
/a/ The "hold-harmless" appropriation is that appropriation needed to allow the Census Division to meet increases in LIHEAP need based on temperature and fuel prices in the Comparison Scenario. If no "bill payment coverage capacity shortfall" exists, the "hold-harmless" appropriation is set equal to $0.					

West South Central Division

The West South Central Census Division did not demonstrate the same sensitivity to price and temperatures as did the other two southern Census Divisions. The West South Central Division would have experienced a substantial shortfall given prices and temperatures in the PY2010 Comparison Scenario, with a bill payment coverage capacity shortfall of 14,004 bills on a base of 449,876 bills. The West South Central Division would have required a hold-harmless appropriation of $7.6 million using the price and temperature data experienced in Comparison Scenario 4 (PY2010).

In contrast, while the West South Central Division experienced a shortfall using data from Comparison Scenario 5 (PY2011), the shortfall was slight in terms of the bill payment coverage capacity shortfall (1,023 bill shortfall on a base of 450,000 bills). The West South Central Division would have required a PY2011 hold-harmless appropriation of less than $1 million ($542,175) on a base LIHEAP allocation of nearly $238 million.

As can be seen from the heating price multipliers in Appendix A and the cooling price multipliers in Appendix B, the West South Central Division did not experience the same increases in electric price in the latest three Comparison Scenarios (PY2009, PY2010, PY2011) relative to the Base Year (PY2008) as did the South Atlantic and East South Central Divisions. Moreover, the West South Central Division experienced slightly cooler-than-normal temperatures in the cooling months (June through August) than did either the South Atlantic or East South Central Divisions.

LIHEAP "Hold-harmless" Needs Given Actual Temperatures and Fuel Prices: West South Central Division					
Comparison Scenario	Base Year Allocation	Base No. of Bills Covered	Bills Covered at Year's Price and Temps	Bill Coverage Shortfall	Hold-harmless Appropriation Need /a/
#1: PY2005 – 2006	$237,885,354	449,876	463,056	0	$0
#2: PY2006 – 2007			514,818	0	$0
#3: PY2008 – 2009			501,211	0	$0
#4: PY2009 – 2010			435,872	14,004	$7,642,948
#5: PY2010 – 2011			448,853	1,023	$542,175
/a/ The "hold-harmless" appropriation is that appropriation needed to allow the Census Division to meet increases in LIHEAP need based on temperature and fuel prices in the Comparison Scenario. If no "bill payment coverage capacity shortfall" exists, the "hold-harmless" appropriation is set equal to $0.					

Despite these differences, the *overall* pattern between the three "southern" Census Divisions (South Atlantic, East South Central, West South Central) was strikingly similar. The overall pattern shows that while the Comparison Scenarios using PY2006 and PY2007 price and temperature data yielded little or no problems with LIHEAP bill payment coverage capacity, the price and temperature data for PY2009, PY2010 and PY2011 yielded more substantial bill payment coverage capacity shortfalls.[42] Moreover, the fact that the three southern Census Divisions had bill payment coverage capacity shortfalls in eight (8) of the fifteen (15) total Comparison Scenarios (three Divisions x five Comparison Scenarios per Division) was not matched in any other area of the country.

Fuel-Specific Bill Changes and Overall Bill Payment Capacity

The Fuel Assistance Tracking Mechanism provides insights into how changes in prices of individual heating fuels, as well as changes in the price of electricity for cooling, might affect the overall bill payment coverage capacity of LIHEAP in individual regions of the country. Not only does the FATM capture the interplay in changing prices and fluctuations in weather, it also captures the interaction between bill changes for different fuels. Bill changes, by fuel, for the Base Year and five Comparison Scenarios are set forth in Appendix D.[43]

New England had no Comparison Scenario where it exhibited a bill payment coverage capacity shortfall relative to the PY2008 Base Year. This largely resulted from the substantial decrease in fuel oil bills in the Comparison Scenarios. The PY2008 fuel oil bill was not matched again except under the PY2011 Comparison Scenario. In that year, however, the fuel oil price increases occurred at a time of lower natural gas prices, thus keeping total average heating bills close to, but nonetheless below, total average heating bills in the Base Year.

[42] As indicated, the West South Central Division differed somewhat from the South Atlantic and East South Central Divisions in this regard.
[43] Bill changes are weighted by the penetration of each fuel in each individual Census Division as reported by the Energy Information Administration of the Department of Energy (EIA/DOE).

The Mid-Atlantic Division exhibited no Comparison Scenario with a bill payment coverage capacity shortfall. The Mid-Atlantic Division had electric bill increases for both heating and cooling. The cooling bill hikes relative to the Base Year were particularly pronounced in Comparison Scenario 4 (PY2010 data) and Comparison Scenario 5 (PY2011 data). Nevertheless, when combined with heating bill declines for natural gas and fuel oil, overall bills in each Comparison Scenario were less than in the Base Year.

The South Atlantic Division experienced a moderate bill payment coverage capacity shortfall in Comparison Scenario 3 (PY2009) and substantial shortfalls in Comparison Scenarios 4 (PY2010) and 5 (PY2011). The South Atlantic results largely reflect significant increases in electricity bills, both heating and cooling. Moderate electric bill increases using price and temperature data for PY2009 were somewhat offset by decreases in natural gas and fuel oil bills. In PY2010 and PY2011, however, the electricity bill increases, particularly for cooling bills in each year, were so substantial as to swamp bill changes for other fuels. Indeed, the impact that increased cooling bills can have on the total LIHEAP bill payment coverage capacity is readily evident in Comparison Scenarios 4 and 5 for the South Atlantic Division.

The East South Central Division also demonstrates how changes in cooling needs can substantially affect a region's LIHEAP bill payment coverage capacity. The most substantial East South Central bill payment coverage capacity shortfalls occurred using price and temperature data from Comparison Scenarios 4 (PY2010) and 5 (PY2011). In these two Comparison Scenarios, increases in electricity and LPG heating bills were more than offset by decreases in natural gas heating bills. Total annual combined heating and cooling bills, however, using price and temperature data from both PY2010 and PY2011 were significantly higher than in the Base Year because of the substantial increase in cooling bills.

The West South Central Division exhibited a pattern very similar to the East South Central Division. Increased electricity and LPG heating bills in Comparison Scenario 4 (PY2010) were somewhat (but not completely) offset by reduced natural gas bills. In Comparison Scenario 5 (PY2011), the combined reduction in home heating bills was completely offset by an increase in cooling bills. Indeed, Comparison Scenario 5 (PY2011) for the West South Central Division is the only Comparison Scenario in the nation in which the total annual combined heating and cooling bill increased even though ***both*** natural gas ***and*** electric heating bills decreased.

The presence of a LIHEAP bill payment coverage capacity shortfall in the East North Central Division is largely driven by natural gas and fuel oil bills. In the two Comparison Scenarios with shortfalls (PY2006, PY2009), each experienced an increase in both natural gas and fuel oil bills. Indeed, the East North Central Division was the only region of the country to experience an increase (albeit slight) in bills for all four heating fuels in a single Comparison Scenario (PY2009). Even this Comparison Scenario, however, shows the impact of cooling bills on LIHEAP. In Comparison Scenario 3 (PY2009), the increased annual heating bill was offset in

substantial part by a decreased annual cooling bill, leaving a moderate bill payment coverage capacity shortfall.

The West North Central Division shows the interplay of natural gas and electric bills. In no Comparison Scenario did the West North Central Division have a LIHEAP bill payment coverage capacity shortfall relative to the Base Year (PY2008). In the West North Central Division, the combined increases in both electric heating and electric cooling prices were not substantial enough to more than offset the decreased natural gas bills in Comparison Scenarios 4 (PY2010) and 5 (PY2011). In addition, LPG bills were relatively stable in those two years (relative to the Base Year).

In the Mountain Division, the presence of a LIHEAP bill payment coverage capacity shortfall cannot be associated with any specific changes in fuel bills. The shortfall in Comparison Scenario 1 (PY2006) was driven by higher natural gas heating and electric cooling bills (offset by a dip in electric heating bills). In contrast, the shortfall in Comparison Scenario 4 (PY2010) was driven by the combined increase in electric heating and cooling bills (offset by a dip in natural gas heating bills). The noticeable increase in cooling bills in Comparison Scenario 2 (PY2007) was more than offset by a decrease in LPG bills, the only Mountain Division Comparison Scenario where LPG bills were substantively different from the Base Year.

The Pacific Division exhibited only one Comparison Scenario in which it would have experienced a LIHEAP bill payment capacity shortfall using price and temperature data in that Scenario. In Comparison Scenario 1 (PY2006), the Pacific Division would have had a slight bill payment capacity shortfall largely attributable to fluctuations in home cooling bills. The total home heating bill for Comparison Scenario 1 was less than the Base Year attributable to reductions in both electric and natural gas heating bills. Despite this decrease in home heating costs, the increase in home cooling during that same year was sufficient to make the total annual combined heating/cooling bill greater than the Base Year. Comparison Scenario 1 (PY2006) for the Pacific Division is only one of two instances nationwide amongst the five Comparison Scenarios (and nine Census Divisions) (45 Comparison Scenarios overall) in which the total annual heating/cooling bill increased despite a lack of bill increases for both natural gas and electricity.[44]

Unlike other Census Divisions discussed above, the cooling bills for the Pacific Division, in general, were insufficiently high to make the difference in the relative level of total annual heating/cooling bills. While cooling bills for the Pacific Division were higher in each Comparison Scenario than in the Base Year, in only Comparison Scenario 1 was the total annual

[44] The other instance, Comparison Scenario 5 for the West North Central Division involved an increase in the total annual home heating/cooling bill despite a decrease in ***both*** the electric and natural gas heating bills. For the Pacific Division's Comparison Scenario 1, electric bills decreased while the natural gas bills remained constant.

heating/cooling bill higher. In each of the other four scenarios, the reduction in the home heating bill more than offset the increase in the home cooling bill.

The reductions in home heating bills for the Pacific Division were largely driven by natural gas bills. In Comparison Scenarios 3 (PY2009), 4 (PY2010) and 5 (PY2011), while both electric heating and electric cooling bills increased relative to the Base Year, the magnitude of those increases was less than the magnitude of the decreases in natural gas bills in the same year.[45]

Summary and Conclusions

The data and analysis presented above supports the reasonableness of establishing a LIHEAP contingency fund to be distributed amongst all or some states in response to circumstances that substantially affect the capacity of LIHEAP to fulfill the objective of addressing home energy affordability. As the Table below demonstrates, as compared to a Base Year (PY2008 in this paper),[46] changes in home heating and cooling prices, when coupled with changes in weather (as measured in Degree Days) can limit the capacity of LIHEAP to cover home heating/cooling bills by tens of thousands of households and tens of millions of dollars. While some years would not experience the need for *any* release of contingency funds (e.g., PY2007 prices and temperatures represented a Comparison Scenario that would not have required a contingency release), in other years, the need is substantial (e.g., PY2010 would have required a release of nearly $100 million) compared to a Base Year of PY2008.

U.S. Aggregated Bill Payment Coverage Capacity Shortfalls Compared to Base Year Coverage and Appropriation						
	Base Year (PY2008)	Aggregate National Shortfalls in Comparison Scenarios				
		PY2006	PY2007	PY2009	PY2010	PY2011
Number of bills	5,850,716	57,008	0	52,831	175,965	120,969
Dollars	$3,437,067,751	$31,418,457	$0	$29,711,783	$94,506,606	$62,738,494

The data and analysis further support the conclusion that the current structure of the LIHEAP contingency funding is appropriate to the extent that such funding:

- May be, but is not required to be, distributed in each program year. The capacity of LIHEAP to meet its bill payment coverage objectives can be influenced by both weather and fuel prices. On the one hand, these two factors can moderate and mitigate the impact

[45] Fuel oil and LPG do not have a sufficiently substantial penetration in the Pacific Division to have an impact on total heating bills.
[46] While the specific results for specific Census Divisions may well have differed if a different Base Year (and/or different Comparison Scenarios) had been used, the lessons learned as set forth in these conclusions would not vary.

of the other (e.g., with warmer-than-normal winter months moderating the impact of higher-than-normal heating fuel prices). On the other hand, these two factors can compound the impact of the other (e.g., with higher-than-normal summer temperatures compounding the effect of higher-than-normal electric prices).

- May be distributed on a region-specific basis. Under no Comparison Scenario studied in this paper was a uniform nationwide impact found (or were shortfalls in LIHEAP bill payment coverage capacity found in every Census Division) in any individual Comparison Scenario. Each significant impact on LIHEAP bill payment coverage capacity instead occurred on a Division-specific basis. Some regions had no shortfall occurring in any of the five Comparison Scenarios studied (relative to a Base Year of PY2008) (e.g., West North Central, New England, Mid-Atlantic), while other regions repeatedly had substantial shortfalls.

The data and analysis presented above supports the conclusion that the distribution of LIHEAP contingency funding should take into account both price and weather.[47] In some instances, where weather-related impacts are positive (i.e., a Degree-Day multiplier greater than 1.0), the fuel price impacts are negative (i.e., a price multiplier of less than 1.0), resulting in either a moderated bill increase or in a bill decrease. The converse can occur as well (a fuel price multiplier greater than 1.0 with a Degree-Day multiplier less than 1.0). The need for contingency funding is, not surprisingly, greatest when bill impacts are compounded by positive multipliers for both prices and Degree-Days. The interaction between prices and weather would seem to counsel that LIHEAP contingency funds be distributed on an after-the-fact basis (rather than on projections). It is not possible to know before-the-fact the extent to which, if at all, changes in fuel prices or weather will be mitigated or compounded by changes in the other variable.

The data and analysis presented above supports the conclusion that the distribution of LIHEAP contingency funds should not take into account changes in the bills for one fuel to the exclusion of changes in the bills for other fuels in the same jurisdiction in the same time period. The overall capacity of LIHEAP to meet its bill payment coverage objectives does not revolve on the bill changes for one fuel. Increases in natural gas bills, for example, are often offset by decreases in the bills for other fuels (or vice versa). While on an individual household basis these offsetting bill impacts do not make a difference, on a programmatic basis they do. While a decrease in natural gas prices does not help a fuel oil user pay his or her fuel oil bill, it does help a state LIHEAP office adjust benefits to reflect the respective needs within the jurisdiction.

[47] Other factors mentioned in the LIHEAP statute as potentially meriting the distribution of LIHEAP "emergency" funds are set aside in this paper not because they are unimportant, but rather simply because they are beyond the purview of a Fuel Assistance Tracking Mechanism.

The data and analysis presented above supports the conclusion that the distribution of LIHEAP contingency funds should be separately determined for heating and cooling months. Numerous examples were evident when home heating bills were substantially "down" in a region in a Comparison Scenario in which home cooling bills were substantially "up." To the extent that LIHEAP contingency funds are "exhausted" (through a complete distribution) by directing those funds to states in response to home heating contingencies, inadequate responses are available for home cooling contingencies. In any given year, a reasonable proportion of LIHEAP contingency funds should be reserved for distribution, if necessary, based on home cooling needs.

To this extent, a predisposition to distribute LIHEAP contingency funds to states facing primarily home heating needs does not reflect the contingency circumstances that arose in the five Comparison Scenarios (compared to a PY2008 Base Year). The data and analysis presented above supports the conclusion that warm weather states, with primarily cooling needs, often face the greatest fluctuations in bills attributable to fuel prices and/or temperatures. Indeed, the largest and most frequent decreases in LIHEAP bill payment coverage capacity identified above occurred in the warm weather Census Divisions.

Heating Month Multipliers: Natural Gas										
Region	2005 – 2006		2006 – 2007		2008 – 2009		2009 – 2010		2010 – 2011	
	Price	Degree Days	Price	Degree Days	Price	Degree Days	Price	Degree Days	Price	Degree Days
New England	1.1170	0.9341	0.9991	0.9341	0.9800	1.0284	0.8583	0.9374	0.8618	1.0123
Mid-Atlantic	1.1022	0.8923	1.0349	0.9197	0.9722	1.0109	0.8718	0.9433	0.8229	1.0101
South Atlantic	1.1494	0.8912	0.9780	0.8915	0.9764	0.9845	0.8262	1.0252	0.7763	1.0147
East South Central	1.2184	0.9169	0.9868	0.9262	1.0397	0.9853	0.7957	1.1059	0.7500	1.0186
West South Central	1.1383	0.8198	0.9133	0.9429	0.9588	0.9004	0.8030	1.1611	0.7730	0.9699
East North Central	1.1783	0.8968	0.9635	0.9405	1.0130	1.0274	0.8320	0.9728	0.7964	1.0149
West North Central	1.1735	0.8649	1.0127	0.9338	0.9360	1.0133	0.8163	1.0182	0.8074	1.0140
Mountain	1.1860	0.8969	1.0692	0.9386	1.0642	0.9021	0.9581	0.9987	0.9233	0.9322
Pacific	1.1134	0.8968	0.9651	0.8964	0.9059	0.8861	0.8588	0.9286	0.8413	0.9615

Heating Month Multipliers: Electricity										
Region	2005 – 2006		2006 – 2007		2008 – 2009		2009 – 2010		2010 – 2011	
	Price	Degree Days	Price	Degree Days	Price	Degree Days	Price	Degree Days	Price	Degree Days
New England	0.8985	0.9321	0.9964	0.9334	1.0935	1.0278	0.9968	0.9328	0.9687	1.0100
Mid-Atlantic	0.9355	0.8976	0.9483	0.9233	1.0482	1.0123	1.0490	0.9458	1.0846	1.0125
South Atlantic	0.9078	0.9131	0.9597	0.8942	1.0996	1.0204	1.0791	1.1189	1.0855	1.0694
East South Central	0.9187	0.9171	0.9446	0.9265	1.1650	0.9846	1.0621	1.1077	1.1648	1.0181
West South Central	1.0045	0.8188	1.0245	0.9477	1.0792	0.8869	0.9689	1.1750	0.9547	0.9650
East North Central	1.0316	0.9001	0.9342	0.9397	1.0067	1.0215	0.8362	0.9784	0.8045	1.0160
West North Central	0.9810	0.8653	1.0004	0.9338	1.1110	1.0090	1.1250	1.0264	1.2160	1.0134
Mountain	0.9436	0.8836	0.9533	0.9519	1.0489	0.9080	1.0914	1.0152	1.0929	0.9587
Pacific	0.9189	0.9476	0.9907	0.9673	1.0160	0.9873	1.0526	0.9736	1.0890	1.0147

Heating Month Multipliers: Fuel Oil										
Region	2005 – 2006		2006 – 2007		2008 – 2009		2009 – 2010		2010 – 2011	
	Price	Degree Days	Price	Degree Days	Price	Degree Days	Price	Degree Days	Price	Degree Days
New England	0.7319	0.9245	0.7229	0.9394	0.7427	1.0293	0.8619	0.9291	1.0288	1.0076
Mid-Atlantic	0.8838	0.8915	0.7115	0.9174	0.7067	1.0084	0.7738	0.9406	0.8056	1.0061
South Atlantic	0.7648	0.9099	0.7147	0.9184	0.7779	1.0146	0.8683	1.0243	1.0398	1.0389
East South Central	0.0000	0.9263	0.0000	0.9382	0.0000	1.0151	0.0000	1.1000	0.0000	1.0360
West South Central	0.7528	0.8250	0.7273	0.9445	0.7274	0.9041	0.8634	1.1700	1.0379	0.9782
East North Central	1.4160	0.8967	1.3189	0.9383	1.3121	1.0270	1.3599	0.9626	0.3744	1.0135
West North Central	0.7811	0.8674	0.7349	0.9253	0.6968	1.0252	0.8218	0.9738	0.9442	1.0096
Mountain	0.0000	0.9165	0.0000	0.9555	0.0000	0.9673	0.0000	1.0040	0.0000	0.9781
Pacific	0.7587	0.9567	0.7353	0.9953	0.7217	1.0412	0.8448	0.9789	0.9998	1.0243

Heating Month Multipliers: LPG										
Region	2005 – 2006		2006 – 2007		2008 – 2009		2009 – 2010		2010 – 2011	
	Price	Degree Days	Price	Degree Days	Price	Degree Days	Price	Degree Days	Price	Degree Days
New England	1.0379	0.9548	0.5571	0.9639	0.9781	1.0575	1.0138	0.9587	1.1303	1.0383
Mid-Atlantic	1.0435	0.8920	0.6132	0.9186	0.9750	1.0099	0.9599	0.9423	1.1125	1.0087
South Atlantic	1.0318	0.9156	0.5402	0.9076	0.9255	1.0173	1.0286	1.0844	1.1027	1.0570
East South Central	1.0423	0.9177	0.5944	0.9265	0.9767	0.9839	0.9930	1.1088	1.0365	1.0188
West South Central	1.0426	0.8191	0.6101	0.9449	0.9761	0.8935	1.0261	1.1662	1.1118	0.9665
East North Central	1.0237	0.8969	0.7006	0.9405	0.9777	1.0265	0.8565	0.9726	0.8718	1.0147
West North Central	1.0316	0.8650	0.5694	0.9331	0.9683	1.0126	0.8852	1.0175	0.9552	1.0135
Mountain	1.0363	0.9055	0.6215	0.9546	0.9680	0.9169	1.0300	1.0153	1.1147	0.9509
Pacific	1.0372	0.9418	0.6254	0.9477	0.9712	0.9473	1.0279	0.9721	1.1139	1.0093

Cooling Month Multipliers: Electricity										
Region	2005 – 2006		2006 – 2007		2008 – 2009		2009 – 2010		2010 – 2011	
	Price	Degree Days	Price	Degree Days	Price	Degree Days	Price	Degree Days	Price	Degree Days
New England	0.8872	1.2650	0.9271	1.0823	0.9678	0.8525	0.8990	1.4553	0.8864	1.2112
Mid-Atlantic	0.8724	1.2514	0.9143	1.1338	0.9681	0.9185	1.0140	1.4633	1.0004	1.2813
South Atlantic	0.9078	1.1095	0.9363	1.1240	1.0394	1.0269	1.0231	1.3087	1.0406	1.2563
East South Central	0.8761	1.1433	0.8785	1.1888	1.0084	0.9817	1.0192	1.3110	1.0497	1.2366
West South Central	0.9358	1.1319	0.8951	0.9998	0.8721	1.0284	0.8563	1.1841	0.8487	1.3345
East North Central	0.8775	1.0986	0.9278	1.1270	1.0366	0.7309	1.0949	1.3602	1.1142	1.2711
West North Central	0.9158	1.2384	0.9467	1.1289	1.0501	0.7397	1.1112	1.1627	1.1558	1.2297
Mountain	0.8947	1.2681	0.9351	1.2561	1.0264	0.9932	1.0671	1.0512	1.0708	1.0987
Pacific	1.0321	1.2181	1.0075	1.1531	1.0361	1.1942	1.0246	0.9970	1.0854	0.9773

Penetration of Heating and Cooling Fuels by Census Division						
Census Division	Natural Gas	Electricity	Fuel Oil	LPG	Heating Fuel Totals	Cooling (electricity)
New England	39%	15%	42%	3%	99%	100%
Mid Atlantic	55%	18%	24%	3%	100%	100%
South Atlantic	25%	65%	3%	7%	100%	100%
East South Central	32%	56%	0%	13%	100%	100%
West South Central	44%	48%	0%	8%	100%	100%
East North Central	64%	26%	3%	6%	100%	100%
West North Central	60%	29%	6%	11%	100%	100%
Mountain	57%	35%	0%	8%	100%	100%
Pacific	57%	41%	0%	2%	100%	100%

Weighted Heating Bills and Cooling Bills by Census Division: Base Year vs. Comparison Scenarios							
New England	Natural Gas	Electricity	Fuel Oil	LPG	Heating Total	Cooling (electricity)	Total
Base (2008)	$315	$45	$508	$0	$868	$45	$913
Comparison 1 (PY2006)	$329	$38	$343	$0	$710	$50	$761
Comparison 2 (PY2007)	$294	$42	$345	$0	$681	$45	$726
Comparison 3 (PY2009)	$318	$51	$388	$0	$757	$37	$794
Comparison 4 (PY2010)	$254	$42	$406	$0	$702	$59	$761
Comparison 5 (PY2011)	$275	$44	$526	$0	$845	$48	$894
Mid-Atlantic	Natural Gas	Electricity	Fuel Oil	LPG	Heating Total	Cooling (electricity)	Total
Base (2008)	$401	$61	$292	$30	$784	$96	$880
Comparison 1 (PY2006)	$394	$51	$230	$27	$703	$105	$808
Comparison 2 (PY2007)	$382	$53	$191	$17	$642	$100	$742
Comparison 3 (PY2009)	$394	$65	$208	$29	$696	$86	$782
Comparison 4 (PY2010)	$330	$60	$213	$27	$630	$143	$772
Comparison 5 (PY2011)	$333	$67	$237	$33	$670	$123	$793

Heating and Cooling Bills by Census Division							
South Atlantic	Natural Gas	Electricity	Fuel Oil	LPG	Heating Total	Cooling (electricity)	Total
Base (2008)	$120	$100	$27	$39	$285	$167	$453
Comparison 1 (PY2006)	$123	$83	$19	$37	$262	$168	$430
Comparison 2 (PY2007)	$105	$85	$17	$19	$226	$176	$403
Comparison 3 (PY2009)	$115	$112	$21	$37	$285	$179	$464
Comparison 4 (PY2010)	$102	$120	$24	$44	$290	$224	$513
Comparison 5 (PY2011)	$95	$116	$29	$45	$285	$219	$503
East South Central	Natural Gas	Electricity	Fuel Oil	LPG	Heating Total	Cooling (electricity)	Total
Base (2008)	$166	$115	$0	$114	$394	$163	$557
Comparison 1 (PY2006)	$185	$97	$0	$109	$391	$163	$554
Comparison 2 (PY2007)	$152	$100	$0	$63	$315	$176	$403
Comparison 3 (PY2009)	$170	$132	$0	$109	$411	$161	$572
Comparison 4 (PY2010)	$146	$135	$0	$125	$334	$218	$624
Comparison 5 (PY2011)	$127	$136	$0	$120	$383	$211	$594
West South Central	Natural Gas	Electricity	Fuel Oil	LPG	Heating Total	Cooling (electricity)	Total
Base (2008)	$122	$92	$0	$44	$259	$270	$529
Comparison 1 (PY2006)	$114	$76	$0	$38	$228	$286	$514
Comparison 2 (PY2007)	$105	$90	$0	$25	$220	$242	$462
Comparison 3 (PY2009)	$106	$89	$0	$39	$234	$242	$475
Comparison 4 (PY2010)	$114	$105	$0	$53	$272	$274	$546
Comparison 5 (PY2011)	$92	$85	$0	$47	$224	$306	$530

Heating and Cooling Bills by Census Division							
East North Central	Natural Gas	Electricity	Fuel Oil	LPG	Heating Total	Cooling (electricity)	Total
Base (2008)	$409	$72	$37	$59	$577	$77	$655
Comparison 1 (PY2006)	$432	$67	$47	$55	$601	$75	$675
Comparison 2 (PY2007)	$370	$63	$46	$39	$518	$81	$600
Comparison 3 (PY2009)	$425	$74	$50	$60	$609	$59	$668
Comparison 4 (PY2010)	$331	$59	$48	$50	$488	$115	$603
Comparison 5 (PY2011)	$330	$59	$14	$53	$456	$110	$566
West North Central	Natural Gas	Electricity	Fuel Oil	LPG	Heating Total	Cooling (electricity)	Total
Base (2008)	$375	$69	$0	$108	$552	$94	$647
Comparison 1 (PY2006)	$381	$59	$0	$96	$536	$107	$643
Comparison 2 (PY2007)	$355	$65	$0	$57	$477	$101	$578
Comparison 3 (PY2009)	$356	$78	$0	$106	$540	$73	$613
Comparison 4 (PY2010)	$312	$80	$0	$97	$489	$122	$611
Comparison 5 (PY2011)	$307	$86	$0	$104	$497	$134	$631

Heating and Cooling Bills by Census Division							
Mountain	Natural Gas	Electricity	Fuel Oil	LPG	Heating Total	Cooling (electricity)	Total
Base (2008)	$240	$77	$0	$66	$383	$109	$491
Comparison 1 (PY2006)	$255	$64	$0	$62	$381	$123	$505
Comparison 2 (PY2007)	$241	$69	$0	$39	$349	$128	$477
Comparison 3 (PY2009)	$230	$73	$0	$59	$362	$111	$473
Comparison 4 (PY2010)	$230	$85	$0	$69	$384	$122	$506
Comparison 5 (PY2011)	$207	$80	$0	$70	$357	$128	$485
Pacific	Natural Gas	Electricity	Fuel Oil	LPG	Heating Total	Cooling (electricity)	Total
Base (2008)	$159	$82	$0	$0	$241	$62	$303
Comparison 1 (PY2006)	$159	$72	$0	$0	$231	$78	$308
Comparison 2 (PY2007)	$138	$79	$0	$0	$217	$72	$288
Comparison 3 (PY2009)	$128	$83	$0	$0	$211	$77	$287
Comparison 4 (PY2010)	$127	$84	$0	$0	$211	$63	$274
Comparison 5 (PY2011)	$129	$91	$0	$0	$220	$66	$285