METHODS OF MEASURING ENERGY NEEDS OF THE POOR:
An Introduction

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INTRODUCTION

Although news stories about the effects of spiraling energy prices and threats of winter fuel shortages are a thing of the past, the poor in this country still struggle mightily to pay for energy to their homes. Across America, low income families have been hit from all sides: rising energy prices, declining real incomes and devastated public benefit programs.

The resulting unaffordability of home energy to low-income households has been well-chronicled. According to the National Consumer Law Center study *The Forgotten Crisis*,[\1\] among the 16 states for which average income data was available for LIHEAP[\2\] recipients, after paying their winter heating bills, the average LIHEAP recipient had roughly $75 or less remaining per week to pay for all other household expenses, including housing, food, transportation, medical care and clothing. To put that figure in perspective, the average household nationwide spends $60 per week on housing (excluding energy) and $67 per week on food.

That low-income households often have, quite literally, more expenses than income from which to pay their utility bills is beyond dispute. A 1989 study in Utah,[\3\] for example, found the cost of a minimum standard of living in that state to be $9,708 (in 1986 dollars). In contrast, the average income of a Utah LIHEAP recipient (for a family of three) was only $6,400. Similarly, a 1986 study in Pennsylvania[\4\]

\1\ Hill C., *et al*. (1989), ***Energy and the Poor: The Forgotten Crisis: A State-by-State Analysis of the Energy Situation Facing the Nation's Poor***, Boston: National Consumer Law Center.

\2\ LIHEAP is the federally-funded fuel assistance program. 42 ***U.S.C.*** §8621, *et seq*. (1990 and 1992 supp.).

\3\ Colton, R. (1989), ***Losing the Fight in Utah: Low-Income Households and Rising Energy Costs***, Boston: National Consumer Law Center.

\4\ Hill, *C., et al*. (1986), ***The Crisis Continues: Addressing the Energy Plight of Low-Income Pennsylvanians Through Percentage of Income Plans***, Boston: National Consumer Law Center.

found that the minimum standard of living for a family of two was $8,445, while in contrast, a two person Pennsylvania household living at 100 percent of the Federal Poverty Level had $7,050 in annual income. A 1986 study of Nebraska found that the cost of a minimum standard of living in that state was $8,854 for a family of four.[5] In contrast, the average annual AFDC income was $3,360; the average income of a household on unemployment was $6,096.

The inability to pay for monthly energy bills results in many low-income households losing their energy service altogether. One 1991 report, for example, found that a whopping seven percent of all North Carolina households lost their primary heating service for a variety of reasons in the last winter.[6] North Carolina households losing their winter heating service went *without* heat for, on average, from one day (electric heating households) to two weeks (natural gas heated and kerosene heated households), depending on the primary heating fuel.

Many of these households lacked any alternative heating source when their primary heating source was out of operation. Nearly four of ten of those households (38%) having lost their primary heat said that they had *no* alternative and, as a result, that they went *without* heat for some period of time during the winter because of the loss. Even those households who didn't lack heat altogether, however, faced major disruptions in their ability to keep warm. Of those households losing their primary fuel last winter, nearly one in four (24%) used either portable kerosene heaters or portable electric heaters as their (expensive and very dangerous) replacement source of heat. A nearly equal proportion of the households losing their primary source of heat relied upon either their cooking stove or their fireplace (20%) as their primary heating source.

In sum, low-income households have an absolute mismatch between their resources and expenses. These households do not pay their home energy bills because they cannot afford to pay. Other households pay, but devote an inordinate amount of household resources to so doing. As a result, many households lose their service entirely. In contrast, other low-income households are forced to rely upon expensive, and dangerous, alternative heating sources. Each of these results is unacceptable.

The study will explore the pros and cons of using different definitions of "need" and will make recommendations.

LITERATURE REVIEW

There is little agreement in the literature about the means to measure "energy needs." There are at least three different methods of defining "energy needs." Each is briefly discussed below. The premise of this research is that without clearly defining the "need" sought to be alleviated, public policy aimed at redressing that need will be confused and confusing. Public policy cannot alleviate a need that has not

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[5] Bureau of Business Research, College of Business Administration (1986), ***The Minimum Cost of Living in Nebraska***, Lincoln: University of Nebraska--Lincoln.

[6] Colton R. and Levison R. (1991), ***Poverty and Energy in North Carolina***, at 59, Boston: National Consumer Law Center.

been defined.

Some researchers, but few indeed, recognize the various alternative components in defining energy need. Consider the introductory paragraphs of the section titled "paying for energy with incomes below poverty" in the Final Report of the Blue Ribbon Commission on Energy Policy for Maine's Low-Income Citizens:[7]

> In recent years when energy prices were relatively low, many low-income families still could not afford to pay for energy, simply because their incomes were insufficient to cover all of their basic needs. For households below the poverty level, paying 12% or more of annual income for heat is a heavy or even impossible burden on top of other basic expenses. In some areas of the State, housing costs, excluding energy, often amount to more than 50% of the poverty level --or, in other words, more than 100% of a typical AFDC family's income. These households are simply unable to pay for heat without assistance.
>
> Even when annual energy costs are less than 12% of income, these low-income families face constant crises from lack of money. Large energy bills during periods of cold weather are likely to be unaffordable, but even smaller energy bills may be unmanageable when medical needs, car problems or housing costs become pressing.[8]

Moreover, the Blue Ribbon Commission found:

> Basic energy services are necessary for health, comfort and safety. Maine winters can cause serous consequences (including death) for those who cannot afford adequate heat. Households who do not have enough money to pay their basic needs* * *will often sacrifice adequate heat to pay for food, housing and medicine. Living with the threat of running out of fuel or having electric or gas service shutoff takes a severe toll on low-income households.[9]

The Commission concluded:

> Other Maine households and businesses also suffer from the effects of unmet energy needs of low-income citizens. Electric utilities carry large uncollectible expenses* * *which are paid for by all ratepayers as a cost of business.* * *Collection costs and working capital on unpaid bills impose costs on energy vendors, utilities, and all

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[7] Ward S. (1990), ***Ready for Winter?: Final Report of the Blue Ribbon Commission on Energy Policy for Maine's Low-Income Citizens***, Augusta: State of Maine Executive Department.

[8] *Id.*, at 16.

[9] *Id.*, at 32.

consumers."[10]

This Maine report thus recognizes each of the components of "need": (1) the inability to maintain home energy service;[11] (2) the burden of energy bills as a percentage of income;[12] and (3) the inability to pay for utility service after considering other household expenses.[13] These three approaches incorporate the different models used in defining and assessing low-income energy needs. Each of these models is discussed individually in greater detail below.

Bill as Percent of Income

One primary means to define "need" involves an examination of the extent to which energy bills exceed a designated percentage of a household's income. This is the definition implicit in the promotion of Percentage of Income Payment Plans (PIPPs) throughout the country.[14] While most analysts and utilities involved with PIPPs agree that little, if any, work has been done to determine what percentage of income is "affordable" to the poor, implicit in programs ranging from the Electric Lifeline Rate adopted by Central Maine Power Company, to the Customer Assistance Program adopted by Columbia Gas Company, to the PIPP adopted by the Rhode Island LIHEAP agency, is the assumption that a household's "need" is that portion of the home energy bill that exceeds a designated percentage of income.

Arguments against use of this definition of need include the definition's failure to account for household-specific expenses (such as high medical expenses), to a failure to *justify* what percentage is deemed "affordable," to a failure to account for the large number of low-income households who pay their bills notwithstanding the fact that the bills exceed the "affordable" percentage.

One of the first places the percentage of income model appears in the literature is in a 1980 report by the Fuel Oil Marketing Advisory Committee (FOMAC) of the U.S. Department of Energy.[15]

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[10] *Id.*

[11] "Living with the threat of running out of fuel or having electric or gas service shutoff takes a severe toll on low-income households."

[12] "For households below the poverty level, paying 12% or more of annual income for heat is a heavy or even impossible burden on top of other basic expenses."

[13] "* * *even smaller energy bills may be unmanageable when medical needs, car problems or housing costs become pressing."

[14] *See generally*, Colton R. (1991), ***Percentage of Income Payment Plans as an Alternative Distribution of LIHEAP Benefits: Good Business, Good Government, Good Social Policy***, Boston: National Consumer Law Center; Colton R. (1991), ***The Percentage of Income Payment Plan in Jefferson County Kentucky***, Boston: National Consumer Law Center.

[15] Buckley J. and Maggiore Jr., A. (1980), ***Low-Income Energy Assistance Programs: A Profile of Need and Policy Options***, Washington D.C.: Fuel Oil Marketing Advisory Committee of the U.S. Department

FOMAC identified several "flaws" in the 1980 "Federal energy assistance program," including the fact that energy assistance was not "proportional to household energy needs and ability to pay."[16]

FOMAC then defined low-income energy needs in terms of percentage of income expenditures on home energy. Home energy expenditures of low-income households[17] was projected to reach nearly 22 percent in 1980.[18] In contrast, FOMAC said, median-income households would spend only 5.1 percent of their income on home energy.[19] Thus, FOMAC reported:

> In brief, the percentage of income that low-income households will spend on home energy, on the average, will be *four times* that of median-income households. Energy costs of the poor will exceed $800 per household on an annual basis and the poor will utilize *21.8%* of their income directly on household energy.[20]

(emphasis in original). FOMAC concluded as to evidence of low-income energy needs, "it is apparent that the low-income households in America pay a far higher proportion of their total annual income for energy than do median-income households."[21]

More recently, a study by Barua, *et al.*, also concentrated on the percentage of income attributes of "energy needs."[22] Barua found that "on average, heating costs were equivalent to nearly 25 percent of LIHEAP household income and ranged as high as 71 percent and as low as 8 percent."[23] Barua identified two "areas of concern," both of which were based on the percentage of income approach to defining energy needs: "(1) the low level of relative assistance provided to households with very low incomes but high energy costs; and (2) the high energy cost burdens borne generally by low-income households even after the fuel assistance benefits provided by the state program are taken into

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of Energy.

[16] *Id.*, at 4.

[17] "Low-income" was defined to be at or below 125 percent of poverty for all households except the elderly. Low-income for the elderly was defined to be households living at or below 150 percent of poverty.

[18] *Id.*, at 8.

[19] *Id.*, at 11.

[20] *Id.*, at 11.

[21] *Id.*, at 14.

[22] Barua R., *at al. (1987),* ***Energy Needs and Costs of Low-Income Households: A Preliminary Profile of Delaware LIHEAP Clients***, Newark, Delaware: Center for Energy and Urban Policy Research, University of Delaware.

[23] *Id.*, at 4.

account."[24] Barua cites as evidence for his "concerns" that: "* * *nearly 25 percent of LIHEAP household income is needed, unless full assistance is received, to pay heating costs. For those with less than $4,000 in annual income, heating costs equal nearly 40 percent of their income." He concluded: "clearly, a substantial burden is being borne by many Delaware households with low incomes in trying to cover their heating costs."[25]

Finally, one research effort sought to apply a merged percentage of income/available resource test of sorts. According to Auch, "an individual's `need' for assistance was defined as the ratio of the household's heat cost to annual income adjusted for family size. It represents the percentage of the household's adjusted income that goes to pay for heat."[26] The incorporation of the "available resource" model occurs through the adjustment in gross income for household size.[27] Annual income is adjusted downward to take into account the additional expenses associated with increased family size.

Available Resources to Pay Bill

At least two jurisdictions look not at energy bills as a percentage of income as their definition of need, but rather at a calculation of available resources left after paying "necessary" household expenses with which to pay a household's energy bill. This is the principle underlying Iowa's Affordable Budget Payment Plan as well as behind the Customer Assistance Program (CAP) adopted by Philadelphia Electric Company.[28] This definition of need states that it matters not so much what portion of a household's income is devoted to home energy bills, but rather simply whether there is enough household income to pay those bills, be they above or below a designated percentage of income level. To study energy needs using this determinant requires the construction of a household budget and a determination of the extent to which low-income households have little or no income left after paying other essential household expenses.

Arguments against using this mechanism include criticism of the "Big Brotherism" inherent in evaluating what are "essential" household expenses, the administrative costs of making individualized determinations, and the inherent possibility of having different individuals or offices apply different standards to similarly situated households.

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[24] *Id.*, at 5.

[25] *Id.*, at 20.

[26] Auch L. *et al.* (1992), ***A Policy Study for the Washington State Low-Income Home Energy Assistance Program: Final Report***, at 9, Olympia: Washington State Department of Community Development.

[27] *Id.*, at 8 - 9.

[28] This should not be confused with the Energy Assurance Program adopted by the Philadelphia Gas Works or the Customer Assistance Program adopted in Pennsylvania by Columbia Gas Company, both of which are percentage-of-income-based.

Some researchers explicitly set forth this model of defining energy needs. Research by Heiserman is one example. Heiserman sought to evaluate the effectiveness of the Iowa Affordable Heating Payment Program (AHPP).\29\ Heiserman posited that the purpose of the AHPP was to "reduce heating cost liability to a payment level* * *sustainable from household resources."\30\ He set forth that the "income available to pay heating costs" includes "only the amount remaining after gross income has been reduced by monthly out of pocket expenses for housing (rent, or mortgage, insurance, and taxes), recurring medical costs, child support or alimony payments, and nonheating electricity usage."\31\ Iowa requires 25 percent of this "available income" to be paid toward heating costs.\32\ This Iowa approach is the prototypical "disposable income model."

The Iowa approach incorporates elements of the "maintenance of service" model, as well, however. Heiserman said, the purpose of the Iowa program was to "provide() a variety of interventions to reduce the risk that low-income households would lose residential heating service."\33\

In undertaking to evaluate the Iowa program in light of these definitions of need, Heiserman focuses in on the two constructs that he established at the beginning of his evaluation. He begins on track, by noting amongst other things that the study households "can and do maintain continuous primary heating fuel service" and that a high percentage of the study households "had service for the five month heating season or longer."\34\ Hence, he considers his maintenance of service constraint. Moreover, Heiserman notes that the program requires participants to "make a `reasonable' copayment equal to 25% of their available income during the five heating season months* * *."\35\ As can be seen, Heiserman remains true to his "available resource" model as well.

Philadelphia Electric Company (PECO) is another institution that has adopted the "available resource" model to define low-income energy needs. According to this company's program evaluation for its low-income program (called CAP: the Customer Assistance Program), the utility was "burdened with a cumbersome and lengthy collections process, which claimed the financial resources of the Company (and its ratepayers) and drained the emotional resources of its service representatives."\36\ According to

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\29\ Heiserman O. (1990), ***Iowa Affordable Heating Payment Program: Pilot Project Evaluation***, Des Moines: Iowa Department of Human Rights.

\30\ *Id.*, at 4.

\31\ *Id.*, at 33.

\32\ *Id.*

\33\ *Id.*

\34\ *Id.*, at 5.

\35\ *Id.*, at 6.

\36\ The Conservation Company (1987), ***Evaluation of Philadelphia Electric Company's Customer***

PECO's evaluation:

> The latter were frequently frustrated by their inability to effectively assist a growing number of their clients: customers who were consistently delinquent, who had accumulated large arrearages, and who appeared to have severe financial difficulty in keeping up with current bills. Many appeared to be unable to handle even the easiest repayment terms* * *.\37\

Philadelphia Electric thus created a low-income program that measured "need" based on available resources. "CAP works with each participant through detailed interviewing to arrive at an amount deemed to be affordable for electric service. That fixed monthly amount may be as low as $2."\38\ This income and expense statement process is directed at "customers who are payment-troubled --who have fallen seriously behind in paying their bills and/or have broken one or more payment agreements-- and who claim that they are more or less chronically unable to pay* * *."\39\

Hoffman approaches his available resource test differently in his model for defining low-income energy needs.\40\ One approach to defining need, Hoffman states, "would focus on the energy costs of lower-income households relative to available resources."\41\ Hoffman's "available resource" test, however, assumes that it is the *non*-energy expenses that represent the marginal payments. His concern is not that insufficient household dollars are left to pay energy bills after other household necessities are purchased. Rather, Hoffman states "energy costs vary sharply by circumstance and location, and* * *some households must persistently devote large shares of income to energy, thereby limiting the purchase of other essential items such as food and clothing."\42\

Persistent Arrears and Service Terminations

A final mechanism for defining need is to look not at current home energy bills, but to look at the level and impact of household arrears instead. This philosophy holds forth that, regardless of the burden imposed upon a household by the payment of home energy bills, the fact that the household is in "need"

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Assistance Program: November 1 1985 to October 31, 1986, Philadelphia: Philadelphia Electric Company.

\37\ *Id.*, at I-1.

\38\ *Id.* at I-1 and III-1.

\39\ *Id.*, at III-1.

\40\ Hoffman, W.L. (1979), ***Providing Energy Assistance to the Poor: Choices Relevant to Design of Future Programs***, Washington D.C.: The Urban Institute.

\41\ *Id.*, at 14.

\42\ *Id.*

is manifested only at that point where the unaffordability of the household's bill will result in adverse payment patterns. The model posits, in other words, that it is irrelevant what the household bill is as a percentage of income, for example, so long as, *in fact*, the household makes its payments. In contrast, payment problems (and thus household energy needs) are reflected in utility arrears and service termination statistics.

Seeking to address this energy need is the purpose of programs such as those adopted by Wisconsin Gas[\43\] and Niagara Mohawk[\44\] through which households can work off prior arrears either by making regular current payments or by reducing current bills through conservation, or both.

In this regard, the reasoning of the Pennsylvania Commission in September, 1990, relied upon this model of "need" when it directed Columbia Gas of Pennsylvania to implement a pilot Energy Assurance Program (EAP), stating:

> * * *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' problem 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* * *the [Office of Consumer Advocate's] proposed EAP program should be tried.[\45\]

Note that the "problem" identified by the PUC for "the poorest households" in this Order was not a mismatch between income and energy bills, but rather the inability of such households "to pay their bills in full and to keep their service."

Researchers, however, have often tended to confuse this operational definition of "energy needs" with other definitions based on income and expense models. Weathers, for example, begins her analysis of the "unaffordability gap" in Utah by stating "the fact that any low-income utility consumer finds herself perpetually in arrears and repeatedly facing shutoffs despite the existence of emergency assistance programs indicates the need for new solutions."[\46\] She continues: "the thousands of Utahns who watch their utility arrearages grow and confront termination of service repeatedly are not financially

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\43\ Wisconsin Gas Company (1988), ***Weatherization Arrears Savings***, Milwaukee.

\44\ Harrigan, M (1992), ***Evaluating the Benefits of Comprehensive Energy Management for Low-Income, Payment-Troubled Customers***, Washington D.C.: Alliance to Save Energy.

\45\ ***Pennsylvania Public Utilities Commission vs. Columbia Gas Company of Pennsylvania***, Docket R-891468, Decision and Order (September 1990).

\46\ Weathers, S. (1987), ***Utility Ratepayers, Winter Heating Costs, and the Unaffordability Gap***, Salt Lake City: Utah Issues Information Program.

capable of providing the solution themselves."'[47]

Weathers, however, never quantifies this low-income energy "need" as evidenced by her posited permanent --and growing-- arrears as well as repeated shutoffs of service. Rather than staying with her operational definition of energy needs, Weathers instead slips into a percentage of income model in her actual quantification of energy needs, noting three specific findings, including:

> "o The average urban consumer spends 6.5% of gross household income on utility service; low-income consumers spend 22% (close to the percentage recommended by experts for `total' shelter costs including utility service).
>
> "o The difference between the average percentage of income paid by low-income consumers and that paid by average urban consumers may be assumed to be the portion of their utility costs that they cannot afford to pay, or an `unaffordability gap.'
>
> "o Were low-income consumers to pay 6.5% of their income for utilities, the dollar difference between what they would pay and the amount they accrue in utility costs allows estimation of the size of the `unaffordability gap."'[48]

Weathers explains the change in her analytical framework: "Utility write-offs or `uncollectible' accounts have some bearing on the `unaffordability gap.'* * *It might be thought that the uncollectible and the unaffordable are the same. However, the two are not comparable."'[49] After making this blanket statement, however, Weathers does not explain the basis for her conclusion.

SUMMARY

Researchers commonly use three different models by which to measure the "energy needs" of low-income households. The first model looks at the percentage of income represented by the home energy bills of the poor. This percentage of income concept does not reflect the actual expenses of the household on other life necessities, or even the actual payments (as opposed to bills) represented by home energy usage. The second model looks at the household resources available to pay home energy bills. This model seeks to determine whether sufficient income exists from which to pay all necessary household expenses, including home energy. It most often assumes that energy bills are the marginal payments. The third model measures "energy needs" in an operational fashion. This model posits that "need" is to be measured by the inability of households to maintain service (without shutoffs) or to maintain an arrears-free account balance. Under this model, households who are not disconnected or in arrears are not "in need," irrespective of the burden which home energy bills place on household

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[47] *Id.*

[48] *Id.*, at 13.

[49] *Id.*, at 15.

income or available resources.

Most researchers never explicitly choose one model of defining low-income "energy needs" over another. These researchers do not consider the relative merits of the different models and make an affirmative selection. Instead, they merely refer to "need" in general while assuming a generally-accepted definition of what precisely that need is.\50\ Other researchers *effectively* adopt one model over another without articulating the basis for their choice or even acknowledging that they have made a choice among competing alternative analytic approaches. Finally, other researchers articulate a preference for one of the three alternative models, but then, in practice, allow their actual empirical data collection and analysis to slide into another, without acknowledging, announcing or justifying the change.

In sum, the entire area of defining and measuring the "energy needs" of the poor is confused and confusing. No document has ever explicitly articulated the different ways to define and measure this concept or considered whether the differences between the models have significance.

\50\ Either this, or they find no benefit from seeking to define precisely what they mean by "need."