

INTRODUCTION

The energy burden facing low-income households is not improving in the United States. Although the price of energy has decreased, the income of the poor has generally decreased, while their expenditures have also increased. Additionally, the level of benefits provided to help low-income households with the costs of energy has substantially decreased.

The burden on a household imposed by energy costs can be analyzed through four factors: energy price, energy consumption, income level, and level of assistance provided to help with the costs of energy. The combination of the previous four factors indicate that the energy burden is continuing to overwhelm the nation's poor.¹ In other words, the nation's low-income households are paying the same, if not a greater, portion of their energy needs, as they were in 1979.

For the past twenty years, the federal government's solution to this problem has been to create an energy assistance program that helps pay energy bills. Smaller groups and non profit organizations have taken steps to improve energy efficiency in homes to permanently lower the cost of energy. By examining the background of this dilemma, the current policies and programs, the technology available, and the conflicts and concerns, policy alternatives that could permanently alleviate the energy burden facing nearly 35 million homes across America.

BACKGROUND

Historical Energy Trends

The price of all fuels have fluctuated considerably over the years. The rate is different for each fuel. A comparison of the change in the price of the following fuels with the rate of inflation gives a clear idea of how these changes are affecting low-income households.²

Natural Gas. Gas prices rose by over 100% between 1979 and 1983. Since 1983 prices stayed constant, even falling somewhat. If the gas price in 1979 is compared to its 1993 price, taking into account an inflation rate of 99%, the

¹ National Consumer Law Center, Energy and the Poor--The Crisis Continues (1995), 9

² Low income households represent those households with annual incomes below 150 percent of the poverty line or 60 percent of median State income. Average households are those with annual incomes above the previous guidelines.

actual cost of gas is the same for consumers.³ The price of gas increased at approximately the same rate of inflation implying that the majority of poor people in the nation experienced a great increase in the cost of energy. Most poor people did not see their income increase at the rate of inflation during those years, explaining the energy cost increase. Over 50% of low-income households across the United States use natural gas as their primary heating fuel.⁴ On the contrary, approximately 54% of average households use natural gas as their main heating fuel.⁵ (Table 1 and Figure 1).

Electricity. Between 1979 and 1993, electricity prices have not kept the pace with inflation. Therefore, a household with income that increases steadily with inflation would have noticed a decrease in energy burden. Low-income households, however, did not experience a significant decrease in electricity costs. Approximately 27% of low-income households use electricity as their primary heating source.⁶ As a comparison, nearly 25% of average households use electricity for their main heating source. For many it is a key secondary heating source, and everyone relies on it for lighting. The majority of poor households use electricity for cooling.⁷(Table 1 and Figure 1).

Oil. During the same time period, oil prices have fallen. With the inflation rate approaching 100%, the price of oil has increased only 33% between 1979 and 1993. Only about 11% of low-income households rely on fuel oil for their primary heating source, thus not reducing the energy burden.⁸ Average households are at the same percentage of fuel oil use.⁹ (Table 1 and Figure 1).

The rate of inflation coupled with energy prices hurts the poor. Low-income household incomes do not keep the pace with inflation, making energy prices comparatively higher. Energy price, however is just one aspect of defining the energy burden.

Table 1

Energy Price Increases/Poverty Threshold Increases: 1979-1993

³ National Consumer Law Center, Energy and the Poor-- The Crisis Continues (1995),11

⁴ U.S. Department of Health and Human Services. Low Income Home Energy Assistance Program, Report to Congress for Fiscal Year 1992, at 17.

⁵ Low-Income Home Energy Assistance Program Home Energy Notebook: FY 1995, "FY 1995 Home Energy Data", Home Energy Data. September 1996, <<http://www.acf.dhhs.gov/programs/liheap/notebook.htm,4>> (7/10/98)

⁶ Ibid, 5

⁷ U.S. Department of Health and Human Services. Low Income Home Energy Assistance Program, Report to Congress for Fiscal Year 1992, at 20

⁸U.S. Department of Health and Human Services. Low Income Home Energy Assistance Program, Report to Congress for Fiscal Year 1992 , at 17

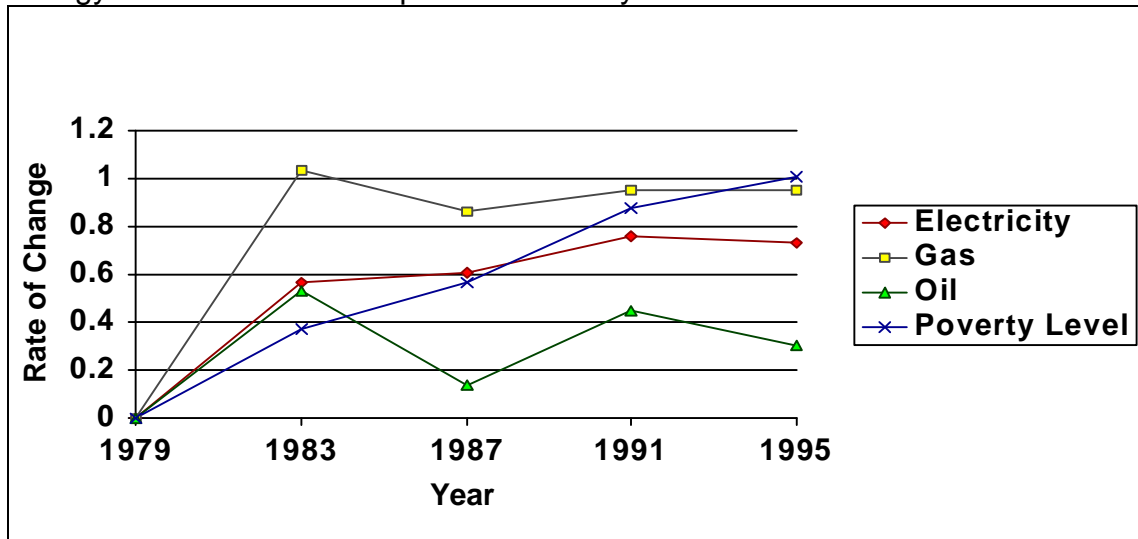
⁹Low-Income Home Energy Assistance Program Home Energy Notebook: FY 1995, "FY 1995 Home Energy Data", Home Energy Data. September 1996, <<http://www.acf.dhhs.gov/programs/liheap/notebook.htm,5>>(7/10/98)

	ELECTRICITY cents per kwh	Increase% from 1979	GAS \$per 100ft ³	Increase% from 1979	OIL cents per gal	Increase % from 1979	Poverty Threshold	Increase% from 1979
1979	4.6	0.00	2.98	0.00	70.4	0.00	5784	0.00
1980	5.4	17.39	3.69	23.83	97.4	38.35	6565	13.50
1981	6.2	34.78	4.29	43.96	119.4	69.60	7250	25.35
1982	6.9	50.00	5.17	73.49	116	64.77	7693	33.00
1983	7.2	56.52	6.06	103.36	107.8	53.12	7938	37.24
1984	7.5	63.04	6.12	105.37	109.1	54.97	8277	43.10
1985	7.8	69.57	6.12	105.37	105.3	49.57	8573	48.22
1986	7.4	60.87	5.83	95.64	83.6	18.75	8737	51.05
1987	7.4	60.87	5.54	85.91	80.3	14.06	9056	56.57
1988	7.5	63.04	5.47	83.56	81.3	15.48	9435	63.12
1989	7.6	65.22	5.64	89.26	90	27.84	9885	70.90
1990	7.8	69.57	5.80	94.63	106.3	50.99	10419	80.13
1991	8.1	76.09	5.82	95.30	101.9	44.74	10860	87.76
1992	8.2	78.26	5.86	96.64	93.4	32.67	11186	93.40
1993	8.0	73.91	5.82	95.30	93.5	32.81	11521	99.19

Notes: The poverty threshold is established each year by increasing the previous year's threshold by the change in the Consumer Price Index (CPI)

Source: Energy Data from the Energy Information Admin. Monthly Energy Review (Aug.1993)

Figure 1
Energy Price Increase Compared to Poverty Level Increase



Notes: Data adjusted by author to reflect 1995 data, based on table below.

Source: Energy Data from Energy Administration Monthly Energy Review (Aug.1993)

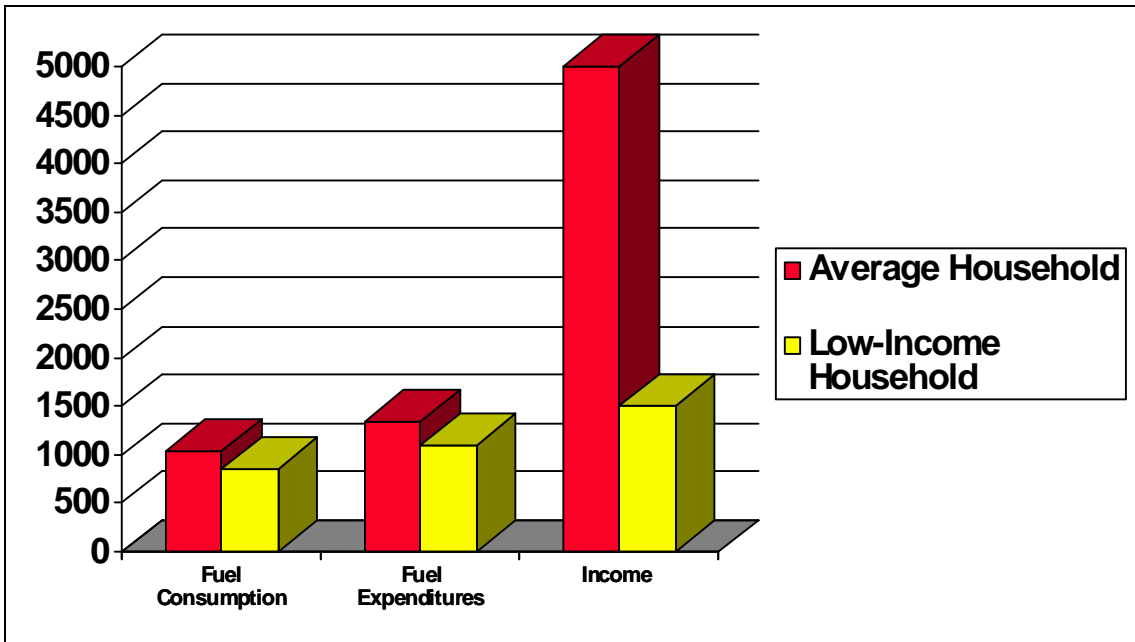
Energy Use Comparison

Two additional factors of analyzing the energy burden on the nation's poor are energy consumption and income level. For the following chart, comparisons are made among two income groups: average and low-income households. The chart below indicates that low-income households consume about 21 percent

less energy for all residential purposes than do average households¹⁰. It also shows that low-income households spend nearly two times as much of their annual income on energy expenditures compared to average households. (Figure 2).

Figure 2

Average Annual Household Energy Consumption, Expenditures, and Income



Notes: Fuel consumption is in cmBTU's, Fuel Expenditures in dollars, and Income in dollars*10

Source: Department of Energy's Residential Energy Consumption Survey (RECS), Fuel Consumption and Fuel Expenditures (1995), Income (1997)

CURRENT PROGRAMS AND POLICIES

The fourth component of looking at the energy burden facing a household is the level of assistance. In the following section, two current policies and programs will be discussed, to give an idea of how many low-income households receive either cash assistance, community assistance, or both.

Low-Income Home Energy Assistance Program

¹⁰ Low-Income Home Energy Assistance Program Home Energy Notebook: FY 1995, "FY 1995 Home Energy Data", Home Energy Data, September 1996, <<http://www.acf.dhhs.gov/programs/liheap/notebook.htm,5>> (7/10/98)

To date, only one federal program is designed to ease the energy cost burden of low-income individuals. The Low-Income Home Energy Assistance program (LIHEAP) was originally established in 1981. It is a block grant program under which the federal government gives states, the District of Columbia, U.S. territories and commonwealths, and Indian tribal organizations annual grants to operate home energy assistance programs for low-income households. Federal requirements are minimal and leave most decisions to the grantees. The Department of Health and Human Services, which is the federal sponsor, is prohibited from dictating how grantees administer their programs.

The eligibility for these block grants is limited to welfare recipients and households with incomes up to 150 % of the federal poverty income guidelines, or if higher, 60% of the state median income.¹¹ Within these limits, grantees decide which welfare categories to include, set income limits, may impose other eligibility requirements, and may grant priority to those with the greatest energy needs or cost burdens. Federal standards do require a system of crisis intervention assistance for those in immediate need. Federal rules also require outreach activities, coordination with the Department of Energy's Weatherization Assistance Program, annual audits and appropriate fiscal controls, and fair hearings for those aggrieved. Grantees decide the mix of benefits, which agencies administer individual components of programs, and make other administrative decisions.

Department of Energy

The U.S. Department of Energy's Partnerships for Affordable Housing Program helps providers of housing for low- and moderate-income families make residential dwellings more affordable through improvements in energy use and cost efficiency. The partnership is voluntary, bringing together leaders in the housing industry, government, and non-profit associations. Partnerships can be led by public agencies or private industry, in accordance with their interests.

DOE provides guidance and technical assistance both directly and through supporting organizations to help partners plan and carry out activities. One technical focus is the systems integration approach for design and renovation. DOE also seeks to coordinate major existing community-directed partnership programs. This coordination will support the ability of communities to reap the broadest possible benefits from long term community rehabilitation programs.

Partnerships for Affordable Housing have three major paybacks. The first is to improve energy efficiency, which will reduce energy costs for struggling families. The second is to improve the comfort and living environment of homes from energy and resource efficient building designs. And lastly, relatively modest

¹¹ CRS Report for Congress, 94-211, Updated 6/25/98

investments in improving the energy efficiency of housing can create funds for up-front payments, maintenance, and other quality advancements.

The goals for the year 2000 include incorporating energy efficiency in the construction of over one million residential units, promoting a comprehensive approach to energy and resource efficient design, construction, and operation, and helping to meet the national energy goals to decrease emissions of greenhouse gases.

The program calls on a three-sided approach. One side is the community housing provider that identifies candidate projects, provides an action plan and specifications, and finances and installs energy efficiency improvements. The Department of Energy is the second program representative, providing and assisting in planning and building performance, and technical assistance. The last segment of the approach is through third parties that provide technical and management support as well as capital investment and financing.¹²

There are two partnerships currently in progress. The first is the Chicago Housing Authority (CHA). CHA pays almost \$45 million annually in utility costs, and is concerned with lead hazards and job creation. They are installing a low cost composite wall system designed in DOE labs that improves insulation while encasing lead hazards. This energy saving wall will reduce energy costs, while it is relatively inexpensive to install. The Affordable Energy Home Center in Chicago opened in spring 1997, and uses energy saving technologies to lower operating costs without increasing purchasing price. It is helping to bridge the historically wide gap between sustainable and affordable housing.

The second partnership is Habitat for Humanity (HFH). HFH is one of the largest builders of new homes in the United States, building approximately 3000 homes a year. Habitat for Humanity International is working to provide local affiliates with resource efficient plans and specifications for standard housing designs to maximize energy efficiency.

ENERGY EFFICIENCY IN BUILDINGS

Energy Efficiency

The previous section discussed one program that incorporates energy efficiency in affordable housing. Since low-income families may spend over 15% of their income on energy to operate their homes, energy efficiency is a way to ease the burden and work towards a permanent solution. In most affordable housing,

¹² U.S. Department of Energy, "Partnerships for Affordable Housing", Program Overview, n.d., <<http://www.eren.doe.gov/buildings/residential/partnero.html,1-4>> (7/10/98)

simple energy efficiency improvements can cut energy costs by over 40%.¹³ The money that families save on energy can help them make mortgage payments, and pay for food, clothing, and other essentials.

To be affordable, housing must be designed and constructed to last and not require expensive maintenance. Energy efficient construction improves building durability by reducing moisture related problems. While some energy features add to construction costs, others can reduce costs. For example, increasing insulation and sealing air leaks reduces heating and cooling needs, allowing for the use of smaller ductwork. The savings on the mechanical systems can pay for the increased cost of insulation and air sealing. Energy efficient framing techniques can reduce lumber costs over 15% and prevent mold growth in outside walls and ceilings.¹⁴

The key to energy efficient homes is a systems approach that considers all energy usage, including heating, cooling, hot water, lighting, and appliances. Dozens of improvements that individually add little to construction costs together yield substantial savings.

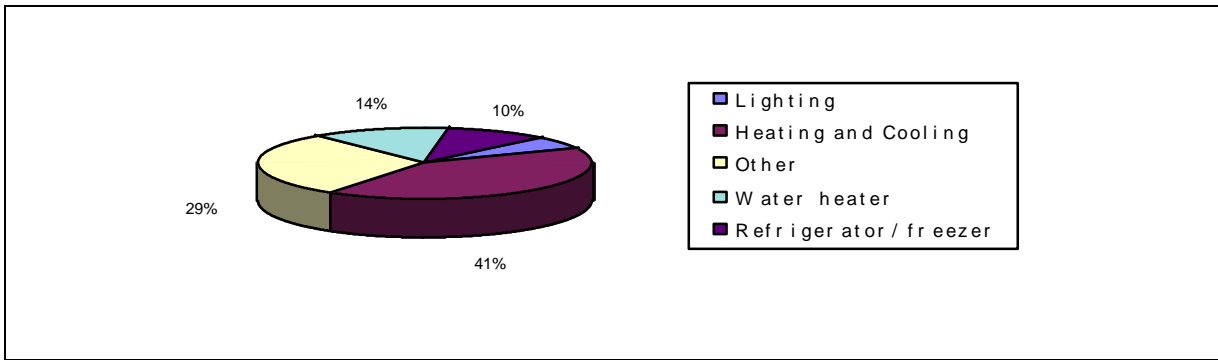
Home Energy Use

Specific building energy technologies target the greatest aspects of home energy use. As the chart shows, most of the energy that cripples low-income households are heating and cooling costs. (Figure 3)

Figure 3 Home Energy Use

¹³ U.S. Department of Energy, "Buildings for the 21st Century", Energy Efficiency Pays, n.d., <<http://www.en.doe.gov>> (7/30/98)

¹⁴ Ibid



Source: U.S. Department of Energy: Energy Efficiency Pays

Building Energy Technology

The technology of interest to the affordable housing market is not the revolutionary new ideas of the 21st century. Such innovative ideas as advanced construction methods and materials, environmental integration and adaptive envelopes, multi-functional equipment and integrated system design, advanced lighting systems, controls, communications, and measurement, and self-powered buildings require strenuous research and development, as well as the capital to support the ideas. Low-income households do not have that capital, so alternative, if not nearly as exciting, ways to improve the energy efficiency of a home are presented.

Air Leakage

Excess air leakage in homes can increase heating and cooling bills by 30% and reduce fire safety.¹⁵ Although windows, doors, and outside walls contribute to air leakage, the biggest holes are usually hidden from view, connecting the house to the attic, basement, or crawl space. Reducing the air leakage is typically inexpensive in the average home.

Insulation

If installed poorly, gaps and compressed areas in the insulation can cut savings over 25%, in affordable houses.¹⁶ Poor insulation also leads to condensation and comfort problems. Proper construction techniques can increase savings significantly.

Water Conservation

¹⁵ U.S. Department of Energy, "Buildings for the 21st Century", Energy Efficiency Pays, n.d., <<http://www.enr.doe.gov>> (7/30/98), 4

¹⁶ Ibid, 1

In larger families, water expenditures can pose as much of an energy burden as heating and cooling.¹⁷ Simple conservation measures, such as low-flow shower heads, tank insulation jackets, and convection traps in hot and cold water lines pay back quickly. Replacing inefficient plumbing fixtures in older homes can save families hundreds of dollars.

Windows

Although energy efficient windows cost more than standard models, they can cut energy bills significantly and lower other construction costs. High performance windows can reduce heating and cooling needs enough to permit smaller and cheaper heating, ventilating, and air conditioning (HVAC) equipment and ductwork. Energy efficient windows improve comfort by minimizing drafts and increasing surface temperatures. They also reduce condensation, which limits mold growth and protects building materials.

Window orientation is also a key component of energy use. It can be as much as 25% for some designs.¹⁸ Solar shades such as screens, roof overhangs, awnings, trees, and other landscaping can provide shade, and reduce summer overheating.

Lighting

Energy efficient lighting saves on electric bills, cools the home by reducing waste heat, and lasts longer. Compact or tubular fluorescent lamps for fixtures that will be on for four hours or more a day provide a great deal of energy saving. Their extra cost is repaid and is complemented by excellent light quality and long life.

Exterior security lighting can cost hundreds of dollars a year to operate, if not energy efficient. High pressure sodium or compact fluorescent fixtures work well for security lighting.

Appliances

Appliance energy use is usually greatest for refrigerators, clothes washers and dryers, and dishwashers. Cheap, inefficient appliances will waste the money of low-income families, because the true cost of an appliance is the purchase price plus the cost for energy and water for operation.

¹⁷ U.S. Department of Energy, "Buildings for the 21st Century", Energy Efficiency Pays, n.d., <<http://www.enr.doe.gov>> (7/30/98), 1

¹⁸ Ibid, 4

CONFLICTS AND CONCERNS

Building Energy Technology

The focus of building energy technology is on the innovative ideas of the 21st century. The government is funding the research and implementation of such ideas, but applications for low-income consumers is not a concern. They are handing out money to aid in the energy burden, but little is being done to improve the energy efficiency of low-income housing. The leadership is now held in community groups, utility companies, and the building industry. There is little motivation for these groups. The problem is that we have the technology and resources, but we are not doing anything to work on implementing it for those who need it most.

Fragmented Markets

The U.S. building sector is diverse and fragmented. The building industry is composed of millions of people, and hundreds of thousands firms. These companies range from multi-billion dollar equipment suppliers to one person design firms. The number of firms in each sector of the industry also varies widely. An example of this is that although only a number of firms provide heating, ventilating, and air conditioning services, over one hundred thousand firms are involved in the construction trade.

The lack of communication between all the players involved in the building industry compounds this problem. Each stage in the life of a building, from design through operation, even to demolition is a separate entity. People and firms, tenants, owners, financiers, and insurers often have differing and sometimes competitive priorities.

Few Financial Incentives

At the present time, there are a variety of state, utility, and federal financial incentives for individuals who invest in, or purchase renewable energy systems. As of April 1997, 32 U.S. states or territories offered one or more financial incentives for investment in residential, commercial, and industrial applications of renewable energy technologies¹⁹. These incentives include income tax credits, income tax deductions, property tax exemptions, state sales tax exemptions, loan programs, special grant programs, industry recruitment incentives, accelerated depreciation allowances, and franchise tax exemptions.

¹⁹ Energy Efficiency and Renewable Energy Network (EREN), "Consumer Energy Information: EREC Reference Briefs", [Financial Incentives for Investment in Residential Renewable Energy Systems](http://www.eren.gdoe.gov/consumerinfo/rebriefs/la8.html), n.d., <<http://www.eren.gdoe.gov/consumerinfo/rebriefs/la8.html>,1-2> (7/10/98)

A few utilities in the United States offer financial incentives for the use of solar energy technologies, primarily solar water heating systems. These include leasing programs, rebates, and low to no interest loans, and grant programs. Rebates for residential solar systems and appliances are no longer taxable, under the Energy Policy Act of 1992²⁰.

The National Energy Policy Act of 1992 contains a provision that encourages investment in renewable energy technologies. Under this act, a business or homeowner can receive a 1.5¢ per kilowatt-hour production tax credit. This rate is annually adjusted for inflation.²¹

These incentives, specifically geared for renewable energy technologies, are not targeted in any way towards low income consumers. There is really no financial incentive for a homeowner or manufacturer to invest in these technologies for low income or public housing.

POLICY ALTERNATIVES

Low-Income Home Energy Assistance Program

One of the policy options that is being debated in the 105th Congress is to eliminate the funding for the Low-Income Home Energy Assistance Program (LIHEAP). The program is a legacy of the oil crisis of the 1970's, that critics say has outlived its purpose. It is a prime target for those seeking budget cuts in Congress. The House Appropriations subcommittee endorsed eliminating it altogether in June 1998, and diverting the \$1 billion to spend on medical research and other programs.

The effectiveness of the program depends on the specific goals. It has served its short-term purpose of providing aid for the energy burdens of the poor. It has not, however, solved any long term problems. As seen earlier, the energy situation for the poor has not changed since the 1980s. The fact that only approximately 25% of eligible LIHEAP recipients receive assistance, renders the problem inequitable.

²⁰ Public Law 102-486, October 24, 1992

²¹ Energy Efficiency and Renewable Energy Network (EREN), "Consumer Energy Information: EREC Reference Briefs", [Financial Incentives for Investment in Residential Renewable Energy Systems](http://www.eren.gdoe.gov/consumerinfo/rebriefs/la8.html), n.d., <<http://www.eren.gdoe.gov/consumerinfo/rebriefs/la8.html>> (7/10/98)

To withdraw funding for the energy assistance program, and put that money towards medical and other research programs, the control would have to turn to the advocacy groups, contractors, and electric and utility companies.

Another solution the controversy over the LIHEAP is to continue it. The assistance program was created to aid those in need with the payments of their energy bills and it does just that. Supporters of the assistance program include non profit organizations, such as the National Consumer Law Center (NCLC), and lawmakers of both parties from cold-weather states. Elimination of the program could cause widespread utility shutoffs among the poor and increase the risk of fires as families turn to candles and other lighting or heating sources.

The flexibility of the program is excellent. The states have a great deal of control, and that allows them to aid the neediest of families. The federal government provides the financial support, while allowing those close to the problem to be the ones to distribute the assistance. Implementation of the LIHEAP is already well in place, and easily managed.

Alternative Energy Assistance Program

An alternative to address the crisis that continues to face the nation's poor is to turn the leadership over to the electric and gas utilities. In this alternative, the government has no role.

Ever since the late 1970s, electric and gas utilities have added energy conservation to their criteria for meeting the energy needs of their customers. These investments bring on new supply resources and help the customer reduce energy bills as well. The term "demand side management" (DSM) is defined generally as electric and gas utility activities that influence use on the customer's side of the meter.

When a utility invests in conservation measures in the home of a low-income consumer, it is performing an invaluable service. Conservation is out of reach of many low income households, without outside financial assistance. And that assistance is used to merely pay the bills, not invest in the future.

An alternative that includes the idea of demand side management is a low use residential design with community and gas/electric involvement.²² This program is looking to reduce residential electricity and gas consumption by providing a variety of energy-conserving equipment and services at little or no direct cost of participants.

²² National Consumer Law Center, [A Guide to Low-Income Energy Efficiency](#) (1996),175-176

The program involves a neighborhood effort, with installation crews of local college students and neighborhood residents, making visits to homes in relatively urban communities. Local community groups and agencies would be invited to participate in the promoting of this program, to increase and ensure the effectiveness of the program.

The technology incorporated in this idea is readily available and easy to access. Simple training sessions from skilled workers would train students and local residents to properly install and evaluate the technological upgrades.

The crews will install measures such as low-flow shower heads, faucet aerators, and compact fluorescent light bulbs, and will provide services such as cleaning refrigerator coils, wrapping hot water tanks, and educating customers on home energy efficiency. In cooperation with the gas utility, hot water efficiency measures will be applied to homes with both gas and electric heated water. Customers will also be offered the option to rent compact fluorescent light bulbs, and have them installed by crews. The crews will, on these visits, identify refrigerators that are good candidates for cost effective replacement, and arrange for rental through a modest monthly fee, for interested customers.

If the program is successful, the electric company will replicate the program in other parts of its service territory. Services can be coordinated with other on site programs and community services. They will also work closely with the local gas company.

The objectives of this program is to reduce the participant's electricity bills, raise awareness among customers about energy efficiency products and techniques in the home, reduce system energy and demand requirements, reduce credit and collection costs, and build good customer relations by helping the customers save energy.

Government and Industry Partnerships

The last alternative is a partnership between the government and private industries. These industries include gas and electric utilities, manufacturers, construction companies, and other members of the building industry.

The partnership would be focused on providing energy efficient technologies for affordable housing. It includes basic technologies such as insulation improvements, lighting upgrades, and water tank wraps, but it also incorporates the future implementation of solar panels and higher grade appliances and systems.

The program would be a step-wise process, with the government gradually phasing out. The government would provide the initial financial support for industry, through grants, tax credits, and other financial incentives. It would then be up to industry to create ways to market their products, sell them cost-effectively, and use correct construction techniques to install them, as well as gathering community support.

A specific example of a government-industry partnership is one with the gas and electric utilities. The government would provide the up front capital to support a program similar to the one described in the previous alternative, and the utility would administer the details. They would seek out the community groups to aid with personnel and perform the energy efficient upgrade tasks. There would be no financial burden on the utility to create such a program. And with the incentives such as public reputation, improved customer relations, and increased clientele, utilities have every reason to invest their time and efforts.

The implementation of the program is very difficult. Convincing Congress to authorize such an investment would require support from members, the public, and industry. At the present time, there is little motivation to invest in energy saving practices. The technology, however, is there and ready to implement. The only real barrier to the proposed alternative is governmental support.

RECOMMENDATIONS

The energy burden facing the nation's poor continues. For a country that is at the front of technological innovation, these accomplishments have not been used in a way that helps all of society. As society changes, so do the solutions to problems. By looking at the three alternatives of the government taking a main role, the government completely stepping out, and a combination of the two, one recommendation can be made: start now, and push for the government to follow.

The government needs motivation to improve energy efficiency for the poor. One way to do that is to start with community organizations, and gradually get more and more people involved. The people can demand technological advancements and support energy efficient practices. They can realize the need to help our nation's members that struggle to heat and cool their homes, and convince their representatives and senators of that. They can favor those industries that support energy efficiency for affordable housing.

This recommendation supports the second policy alternative of the low use residential design with community and gas/electric involvement. It requires no governmental support, and has benefits for both the community and the utilities. It begins to provide a long term solution to the energy crisis the poor face every day.

We have the technology and economic stability to alleviate the energy burden facing our nation. If the community and industry works together, through a great deal of effort and enthusiasm, the government will have no choice but to get involved.

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