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Household Energy Security is a Child Health Issue

The 1st Law of Thermodynamics, also referred to as the Law of Conservation of Energy, indicates that energy can be transformed from one form to another, or transferred from one system to another, but it cannot be created or destroyed. This is, of course the basis for Einstein's famous formula $E=mc^2$.More and more low-income families are learning about the 1st Law the hard way, as they struggle to pay for transport of energy from remote locations into their homes in forms they need, when they need it, and where they need it. Transforming and transporting energy is becoming more costly as the easily recoverable global energy reserves shrink.

Energy Security is receiving growing attention from almost every quarter, though what people mean when they refer to energy security depends on the speakers' perspectives. Probably the most common meaning mentioned by the current administration and the national media is some variation on "unfettered indefinite access to cheap oil," as in "We've got to find ways to ensure America's energy security."

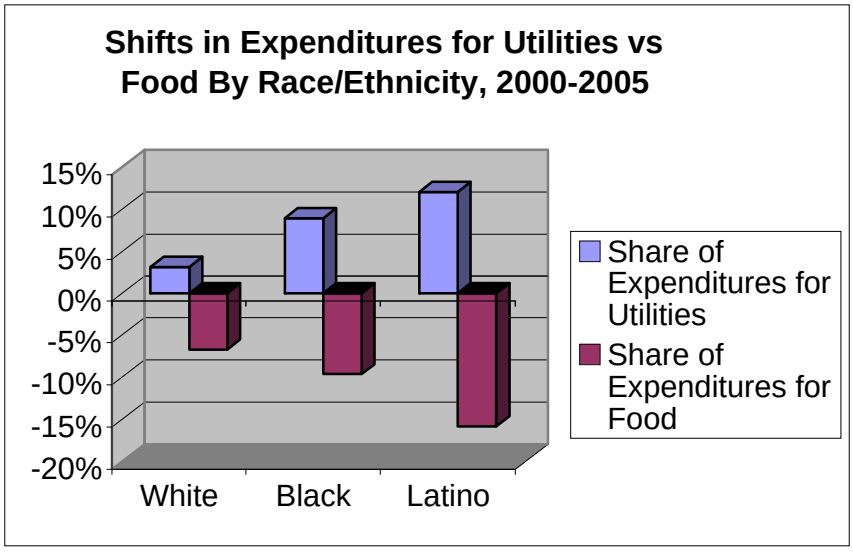
But there is another more immediate and concrete meaning of energy security being heard and used increasingly by pediatric healthcare providers and public health professionals. That meaning is involved in the "heat or eat" phenomenon, and more recently "cool or eat." This kind of energy security relates to households and the families and individuals who live in those households. Household energy security in this sense means:

> "A*ccess by a household to enough of the kinds of energy needed for a healthy and safe life by all household members, in the geographic area where the household is located. An energy-secure household's members are able to obtain the energy needed to heat/cool their home, operate lighting, refrigeration and appliances while maintaining expenditures for other necessities (e.g., rent, food, clothing, transportation, child care, medical care, etc.).*"

Household energy insecurity forces many families to make very hard budget trade-offs that jeopardize the health of their children. As families spend more on their energy bills many are forced to spend less on food, health care, medications, and housing. Adverse physical health impacts on children resulting from these trade-offs can include lack of primary health care, untreated or under-treated medical conditions and growth delay. Adverse mental health impacts include anxiety, depression, learning problems and behavioral disorders. Adverse behavioral,

developmental and educational impacts include behavior problems, developmental delay and grade repetition.

Other major health issues related to household energy insecurity involve use of inappropriate alternative sources of home heat, substandard lighting and budget constraints limiting families' ability to afford appropriate housing. These often result in exposure to unhealthy housing conditions including rodent & cockroach infestation, water leaks and mold, peeling paint and lead paint. Such conditions can lead to preventable injuries from fires, burns, and falls, increased incidence and severity of asthma, and increased incidence of lead poisoning.One of the most insidious trade-offs energy-insecure families often have to make is whether to pay their utility bills or buy food. This is the "heat or eat" decision referred to above. Medical researchers from the Children's Sentinel Nutrition Assessment Program (C-SNAP), and others, have shown this trade-off to be associated with serious adverse health consequences among young children and the elderly. A graphic picture of this trade-off in aggregate is seen in the following chart comparing changes in shares of household expenditures for food versus utilities by race/ethnicity over the period 2000-2005.

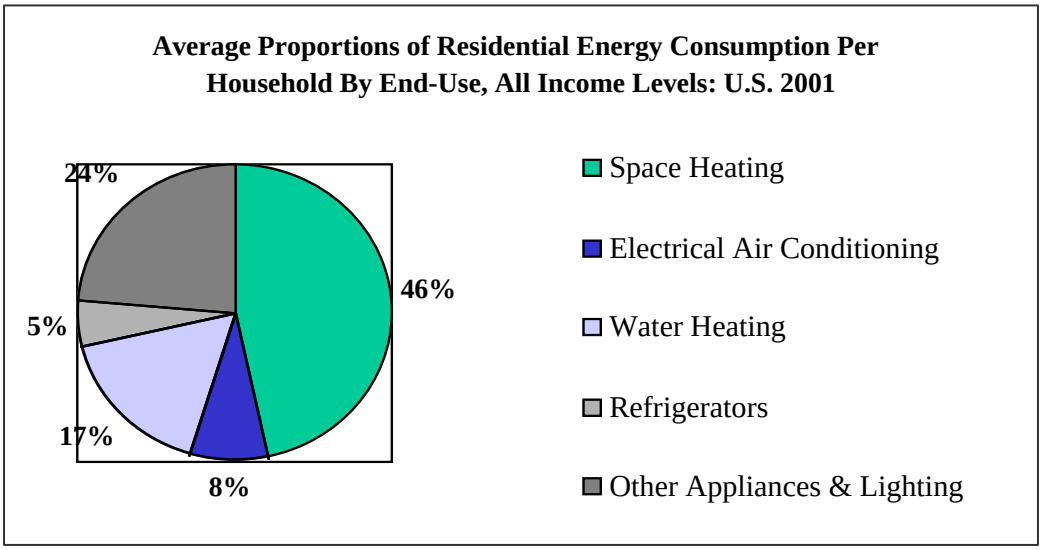


Source: US Department of Labor, Bureau of Labor Statistics

Why is energy becoming increasingly costly if it is all around us? Though energy cannot be created or destroyed, and exists in many forms, all forms of energy are not equally "useful" in human terms. Living in the U.S.A. today requires large amounts of very highly concentrated or refined energy, such as electricity, gasoline and fuel oil. Gaining access to these forms of energy is becoming more and more costly for many reasons.

The chart below shows average proportions of household energy expenditures by end-use. Well over half of all energy used in homes, on average, is for space heating and cooling, with heating comprising the majority of these two. Adding energy for water heating and cooling puts this over two-thirds. For households in northern states where winters can be long and intensely cold, heating fuel is a major household expenditure. On the other hand, for southern states, and states like Arizona, Nevada and regions of California and other states, cooling can be as critical for health, and involve large expenditures for electrical air conditioning.

The usefulness of energy is related to its ability to do work. This, in turn, is related to its degree of organization, or concentration. All energy on earth, in one way or another, derives from sunlight, the least concentrated (at least by the time it reaches us) form of energy we know. Over geological time, however, remarkable transformations occurred to concentrate large amounts of sunlight first into plant and animal life, then into highly compressed fossils or decayed matter in a variety of forms. Among the most remarkable of these fossil forms are petroleum, coal and natural gas.



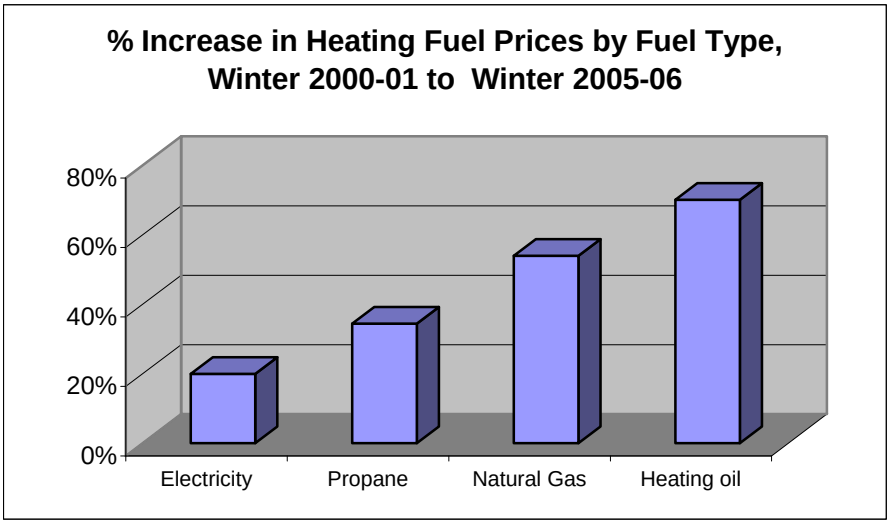
Source: US Energy Information Agency, Residential Energy Consumption Survey, Various Years, ***www.eia.doe.gov/emeu/consumption***

The sheer abundance of fossil fuels, when first "discovered" a relatively short time ago, fostered patterns of consumption that in retrospect seem inefficient and wasteful. For example, burning natural gas, a highly concentrated and "clean" form of energy, to heat water to turn turbines to generate electricity to use to heat water for forced-hot-water space heating, though not uncommon, is arguably not a very efficient use of such a precious resource. But this consumption pattern typifies the myriad questionable aspects of energy production, distribution and consumption built into the U.S. economy and society.

Partly because of the inefficiencies and irrational elements built into our economy, energy systems and policies, we modern humans have not been very good stewards of the earth's fossil energy stocks. In fact it can be convincingly argued that we have been very short-sighted in our energy use and policies. Moreover, through historical accident the earth's fossil energy stocks are not distributed evenly over its surface. Very large proportions of the known global oil

reserves, for example, are located in a small number of countries that, for a host of reasons, are often politically and economically unstable, and not always positively disposed toward the U.S. (to put it mildly). As a result, tremendous uncertainty has emerged in recent years regarding stability and magnitude of fossil energy supplies, with the expected instability in prices.

Recently a large and rapidly growing array of very knowledgeable and well-regarded scientists are arguing convincingly that we have either reached or are approaching the point of having extracted and consumed half of all global recoverable fossil energy. The significance of this argument is not that we are "running out of oil," but that once the half-way mark, or peak, in fossil energy reserves is reached, extracting and consuming the remaining half becomes increasingly costly. Events of recent years make the "peak oil" argument more and more difficult to ignore or deny. The chart below shows one recent consequence of this situation; dramatic increases in fuel prices from 2000 to 2006.



Source: US Energy Information Administration Short-Term Energy Outlook.

Two other inescapable characteristics of energy are extremely important in the contemporary energy picture, particularly for low-income families. First, energy consumption is another name for energy degradation. When we "consume energy" we degrade it from a more concentrated form to a less concentrated form, and work can be done by heat released in the process. When we burn fuel oil to heat our home we degrade a concentrated form of energy (fuel oil) into less concentrated forms (heat, water vapor and exhaust emissions that include carbon dioxide and a number of other problematic materials).

This leads to the second important inescapable characteristic of energy; whenever energy is degraded or transformed from one form to another, waste is created. Very often, consumption (degradation) of energy produces wastes that are released into the environment in solid and/or gaseous forms via exhaust pipes or smokestacks. Sometimes the wastes include heat released into the environment via heated water or air, from cooling towers for example.

Like it or not, we humans have been on a binge of energy degradation for the past couple of centuries, especially the last one. We have degraded an unbelievable amount of very highly concentrated energy over the past 100 years in a frenzy of "progress." Two distressing results of this binge are that we have "used up" most of the easily recoverable fossil fuels so that the costs

of their recovery and refinement have begun to increase, and in the process of "using up" or degrading all that energy we have produced unimaginable amounts of waste that has been released into the environment in the form of very long-lived greenhouse gases.

The many consequences of our fossil fuel binge are present and real. With the power derived from our energy feast, we have created many wonders, some very good and others very bad. After enjoying many of the "goods" for a couple of generations, we have come to payback time. Human activity has been shown conclusively to be a major cause of global climate change. Most of the relevant human activity involves degradation or consumption of energy, and release of wastes into the environment in the form of heat trapping greenhouse gasses.

We are past the time when we can imagine the solution to household energy insecurity simply as making more affordable energy available to households, or making it easier for them to gain access to and degrade more fossil fuels. Though we must strive to accomplish both these goals in the short term, a much broader perspective and broader solutions are necessary.

This past week the Intergovernmental Panel on Climate Change released its latest report on climate change on planet earth. In addition to the authors' conclusions that human activity is a major cause of global climate change, the IPCC report gave the most comprehensive treatment ever provided of the expected consequences of global climate change. The report concludes that the adverse consequences of global climate change will be disproportionately born by poor people the world over.

From inundation of low-lying and coastal habitation and loss of arable land for food production to increases in risk of exposure to vector- and water-borne diseases, the world's poor people will suffer worst from the consequences of global climate change. And this is no less true for poor people in the U.S.

As recognition and fuller understanding of the realities of global climate change and peak oil unfold, the range of feasible responses will hopefully also grow. The IPCC urges all governments and people to make strong commitments to both mitigation (trying to slow down the rate of increase in global temperatures) and adaptation (devising ways to limit the adverse consequences of inevitable temperature increases).

As formidable as the twin problems of global climate change and peak oil are, they also present opportunities (and powerful motivation) for creative, innovative changes. Household energy security advocates are in a position to make very significant contributions toward shaping both short-term and long-term solutions. The baseline assumption that must be made in all these efforts, however, is that poor people's interests will only be included in solutions if there is organized pressure to include them.

Uncritical acceptance of the "free market" myth, and concomitant assurances that "the market will take care of the problem," are the biggest obstacles to creative solutions, especially those that will enable poor people to avoid great harm. The same forces and entities that are responsible for the U.S. government's refusal to accept the evidence regarding global climate change and peak oil are both the loudest proponents of "free market" solutions and the greatest obstacles to open and competitive operation of markets. And they stand to gain most from maintaining the status quo as long as possible.

A renewed vision of the reality and validity of "the common good" is the most important step toward effective solutions to the problems of household energy insecurity, global climate change and peak oil. A return to basic acceptance of the fundamental reality that we are all part of both one and many overlapping communities, and that one of these communities cannot be harmed without harming others is perhaps the second most important part of this vision.

When young children in energy-insecure households suffer health problems, growth impairment and developmental deficits we are all harmed, and we are all responsible. There literally is no “us and them” in these matters. There is only “us.”

The work of the National Fuel Funds Network, the National Energy Assistance Directors Association and other kindred organizations is critical to the discovery and implementation of effective solutions to household energy insecurity and the broader problems of global climate change and peak oil. Our current course is not sustainable, and it is up to all of us, working with and through these organizations and others like them to find and follow one that is.