Why We Should Change Our Message and Goal from
'Use Energy Efficiently' to 'Use Less Energy'

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ABSTRACT

As the evidence accumulates that climate change is due to greater energy use by humans, the need for a reduction of total non-renewable energy use increases. Two approaches to energy reduction are discussed in this paper -- improving the efficiency of end uses of energy and not using, or conserving, energy. These two approaches to using less energy seem to be inclusive. One would use energy only when there a need, and then one would use that energy most efficiently.

Unfortunately, those of us who emphasize the virtues of improved efficiency have been denigrating the overall notion of sufficient, or limited energy use. Data show that this emphasis only on improved efficiency coincides with greater, not less, energy use. This paper analyzes applications of improved efficiency to commercial buildings and automobiles to show that improved energy efficiency rationalizes greater use of energy.

To use less energy, we must change our message so that improved energy efficiency is justified only if it actually lowers total consumption of non-renewable energy, and is not justified if it increases it.

The Promises of Improved Energy Efficiency

Improving the efficiency of an end use produces the same or greater value attributed to that end use with relatively less wasted energy. If the end use is avoided altogether, even greater amounts of energy are conserved, including both the energy which is efficiently used and that which would have been wasted.

The differences between these two options were emphasized during the contest between Presidents Carter and Reagan, in which Reagan explained that no country could conserve its way to greatness while Carter maintained that no energy policy will do as much as voluntary conservation. Reagan won, and since then, many energy and environment experts have preferred improved efficiency over conservation, pointing out that efficiency has many benefits lacking in conservation, such as greater productivity, more jobs and the continuing dominance of American technology, all with no challenge to American high-energy lifestyle.

The following statement further clarifies the difference between conservation and efficiency. It is from the USEA Energy Efficiency Committee, which is the United States' member of the World Energy Council (WEC). It coordinates United States participation in the WEC, and organizes the United States delegation to the triennial Congresses. USEA also sponsors programs on domestic energy issues. The WEC is an international non-governmental organization composed of energy experts from approximately 90 countries.

> In the not-too distant past, "saving" energy implied doing without. Energy curtailment, rationing, and even conservation still carry negative connotations for many people. Fortunately, however, over the past twenty or so years, technology and

know-how have enabled us to "conserve" energy by using it more efficiently; avoiding energy waste either by providing the same level of service (or output) using less energy, or by improving the level of service without increasing levels of energy.[1]

The promise of improved energy efficiency is lower gross use of non-renewable energy, resulting in less atmospheric pollution, greater wealth, and no threat to American high-energy lifestyle.

Delivery on Efficiency's Promise

The points on the chart on Page 3 represent patterns of change in millions of BTU per capita in the United States from 1949 to 1996. Very little of this energy is renewable. The lines show the best-fit trends for each set of points. The lowest line shows an increase in per capita energy use following a decrease in the Carter administration.

The middle line shows the additional per capita source energy, also called "primary " energy, that is required to generate and move the electric power included in the lower line. Electricity is a secondary form of energy that is generated from falling water, nuclear reactions, or from turbines turned by natural gas or steam from burning coal, natural gas or fuel oil. The process of generating and moving electricity wastes about two-thirds of the primary energy. As our nation has become more electrified, the lines showing per capita energy used for the end uses, and that wasted by generating the required electricity, diverge. This pattern shows overall increase in the inefficiency between what energy we use and what total primary energy is required to produce it. These data are from Table 1.5 of US DOE's *1996 Annual Energy Review*[2]. This pattern of increasing inefficiency has been chosen as an indicator of sustainability by the President's Councils on Sustainable Development and on Environmental Quality. The chart is shown at <www.sdi.gov>[3].

The top line adds to the middle line data from Table A-2 of DOE's booklet on *Energy Conservation Trends* produced in April 1995[4]. Adding the per capita energy avoided through improved efficiency to the total energy we use produces a line of even greater slope. This imaginary line illustrates additional benefits from improved efficiency.

In other terms, the lowest line in Chart 1 shows the energy we actually use. The middle line shows the estimated added amount of energy that is increasingly wasted as a result of the electricity required to power the end uses in the lowest line. The top line estimates the amount of energy that is saved because we have become more efficient. If same services were supplied by less efficient technology, the top line represents the even greater, wasted energy that would have been required.

The patterns of these three data sets show (a) we continue to use more and more energy, (b) we have become increasingly inefficient since we started emphasizing improved efficiency, (c) improved efficiency has increased the benefits derived from comfort, light

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1. USEA, 5-step Energy Efficiency Strategy, *Strategic Planning for Energy and the Environment*, Volume 12, Number 1, Page 7
2. Table 1.5, DOE/EIA *Annual Energy Review 1996*.
3. http://198.183.146.250/fig_4-04.gif is the site of the graph.

Table A-2 DOE/EIA *Energy Conservation Trends*, April 1995.

4. Table A-2 DOE/EIA *Energy Conservation Trends*, April 1995.

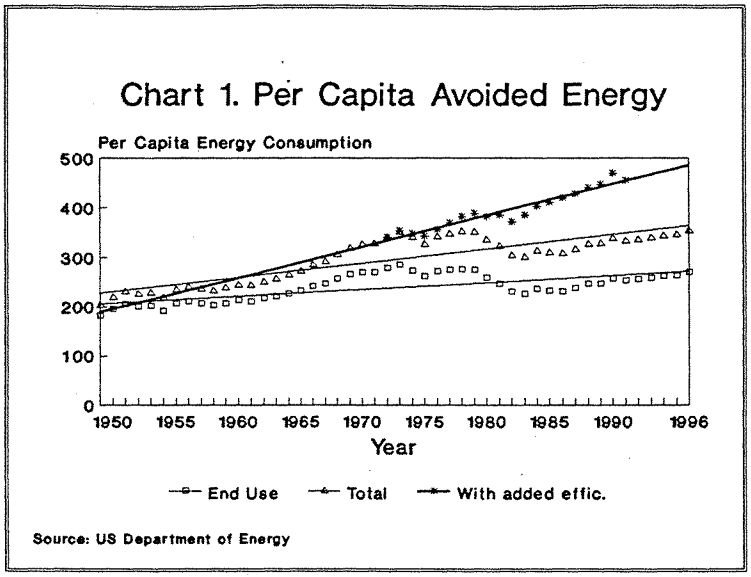

Chart 1. Per Capita Avoided Energy

and electronic communication, (d) the only reductions in per capita energy use occurred at the time of the oil price shocks when we had little of the energy efficient technology which is popular today. We use less and less energy as we go back in time, or, in other words, when we were less efficient, we used less energy.

These data show that our current policies and practices have failed to cause the type of decrease in per capita energy use that would make our behaviors sustainable. Therefore, we should not promote our failed approach to nations that use far less per capita energy than we do. Instead, we should temper our hubris and adopt preferences and behaviors from them.

What is Sustainable?

Reduction in gross use of non-renewable energy is sustainable because a lower rate of use allows natural systems greater chance to re-absorb mined substances or the products of burning them. A continuing increase in total non-renewable energy consumption is not sustainable, but some justify the increase as adding benefits that outweigh costs, such as increased productivity. An increase in features, advantages, benefits of amenities that require energy, however, is not sustainable if it rationalizes an increase in gross consumption of non-renewable energy.

Similarly, since Americans use the greatest per capita amounts of non-renewable energy of any nation ever, we are not a model of sustainability to be followed by other nations whose members use less per capita energy. Only when improved efficiency coincides with a substantial reduction in gross energy use -- one that reduces our per capita energy consumption to the world average, for example -- should efficiency alone be promoted as sustainable. Until then, we need to promote a reduction in gross energy use, including any gains through merely more efficient technology.

What is Improved Energy Efficiency?

Miles per gallon of gasoline describes the proportion of wasted gasoline. Such a ratio, however, is not as valid a measurement of sustainability because the ratio implies no limit to gasoline consumption. Lowering the energy intensity (BTUs of energy consumed annually per square foot) of commercial buildings is another ratio of wasted to consumed energy, but it measures sustainable practice only if there is a reduction in gross consumption of non-renewable energy. Improved lumens per watt is similarly sustainable only if it results in fewer gross kilowatthours consumed, which in turn results in the decommissioning of our dirtier electrical generation plants.

To show that improved efficiency alone is not adequate in reducing gross energy use, this paper examines patterns of energy consumption by commercial office buildings and automobiles. Before doing so, we will examine how efficiency theoretically influences our use of energy.

Efficiency is a relationship of costs to benefits. Examples of benefits include comfort, light, motive power and electronic communication. Examples of energy costs are electricity and fuels like natural gas and fuel oil. We judge the energy efficiency of a process according to the benefit produced with an energy cost. A process is more energy efficient in one or more of the following ways:

(a) The same benefit produced with less energy
(b) Greater benefit produced with the same energy
(c) Even greater benefit produced with slightly more energy

While our notion of efficiency involves all three, our practice of efficiency usually involves just (c) above for three reasons. First, benefits are more visible and tangible than costs. The promotion of more efficient technologies associates them mostly with their features, advantages and benefits. Something sold only on the basis of its cost is almost always on sale at a discounted price. Indeed, costs are minimized by restating them as benefits through low interest payments, coupons, leases, small print, rebates, frequent buyer credits, discounts, and even trading credits for environmental toxins.

With costs less visible and tangible, increased benefits promote the increased use of energy. The beer is just as cold, and the showers are just as hot, with invisible differences in cost. Energy costs are invisible, minimized or made seemingly beneficial. By emphasizing benefits, we cannot see or feel the damage that we are doing to an environment that seems automatically better through improved energy efficiency. We may reference data from computers that model changes in worldwide temperature patterns, but the models seem continually open to debate. In these ways, then, improved efficiency legitimizes the features and advantages of benefits associated with a process.

In Chart 1, the line with the greatest slope is the imagined energy avoided through increased efficiency, when added to the total of the energy used to produce our end uses. The line describes the energy value of the benefits, with improved efficiency making the costs invisible. Some energy experts, for example, say that America is generating more energy from efficiency than any other source. Since the promotion of benefits without cost justifies or rationalizes our use of energy, we could say that the energy avoided with improved efficiency is merely additional benefits, or amenities, which have no cost attributed to them. Some energy experts tell us that this avoided energy is so cheap that it is like a lunch we are paid to eat, which is total benefit with not even zero cost, but negative cost – a "negawatt." Another way of describing these three lines in Chart 1 is that kilowatthours describe services actually billed by electric utilities, and negawatthours describe added imagined amenities without cost.

Improved efficiency is associated with greater energy use for a second reason. In a competitive business environment, using more energy is justified to recoup an investment in more efficient technology. Once a process has been made or judged as more efficient, the return on the investment in the improved technology is recouped by using it. The more it is used, the quicker the return on investment. Also, more efficient technology creates obsolete technology, the embedded energy of which is land-filled faster than recyclers can respond, as with computers for example. In this sense, efficiency promotes discontent with existing technology, speeding its replacement. Another term for this is competitive obsolescence.

And third, improved efficiency involves paternalistic, top-down decision-making and marketing methods. Groups of experts and business leaders determine standards and policies. This method creates the maximum proportion of people who need not be responsible for their energy use, free riding on benefits of new technology. Because of this top-down pattern, improved efficiency benefits the wealthy more than the poor. In this sense, improved energy efficiency disempowers end users, who, with basic decisions made by others, have less motivation to be responsible for the energy they use. Lacking money and power, they are exempt from the decision making process.

When applied worldwide, businesses compete to convince low-energy nations to become discontent with their existing technology. Greater returns on investment come from making low-energy societies more dependent on the benefits of increasingly efficient, but previously unnecessary, amenities. Improving the efficiency of any process sets no limit to energy use, because the value of efficiency is self-referenced within the process itself, decreasing personal accountability to external circumstances. Efficiency tells us what to buy, not how to behave.

Examples of Improved Energy Efficiency

We have achieved considerable progress in adding benefits in relationship to their costs. Some experts imply that the solution to anthropogenic climate change and poverty can be solved merely by making end uses more efficient. The record of past American energy use, however, does not prove that mere energy efficiency lowers gross energy use. We Americans use the most per capita energy of any nation, and we show no sign of decreasing our dependence on energy. Our progress is defined by adding benefits that justify increased gross energy use. Here are two examples:

Improving the Energy Efficiency of Commercial Buildings

In the past thirty years, we have improved the efficiency of almost every component of our buildings. We now have much more efficient motors, air conditioners, furnaces, direct and indirect water heaters and computers. Since 1970, we introduced variable speed drives and variable volume HVAC with direct digital control, energy management systems with optimal start, economizers and double-bundle condensers on chilled water systems. We created flame retention head oil burners and pulse combustion. We popularized cogeneration and air-to-air heat pumps, which evolved into even more efficient ground source heat pumps. We promoted gas-fired ceramic panel and vented tubular infrared heating. All of this should have reduced our use of electricity and fuel in commercial buildings.

Our appliances have been made more efficient by microwaves, lasers, sophisticated sensors and digital controls. We now have fiber optics, wireless communication and personal computers that seem to improve the efficiency of almost everything. We promoted water-saving showerheads and flow restrictors to reduce the use of heated water.

Behind these changes in technology, we have also endured more regulatory promotion of energy efficiency than ever before. Since 1970, we created the Department of Energy, State energy offices and the Environmental Protection Agency. We have had the Commercial and Apartment Conservation Service, and demand side management, which targeted commercial buildings. We created energy efficiency tax credits, the Model Energy Code and ASHRAE Standard 90, appliance labeling, and energy auditor certification. We have had shared savings agreements and EPA Green Lights and Energy Star Programs.

Since 1970, our artificial lighting has become much more efficient. We converted to high pressure sodium, metal halide, compact fluorescent and light emitting diode lighting, and T8 fluorescent tubes and electronic ballasts, with reflectors and sensors to moderate for varying degrees of daylight and turning off automatically when no occupants are sensed.

We began to insulate with advanced products such as isocyanurate, extruded polystyrene and densely-packed cellulose. Our windows became sealed thermal-paned which evolved into low-emissivity glass of several types. We invented shading devices and window quilts and films to reflect radiant heat.

According to US DOE/EIA[5] the result of the improved efficiency of all building components is shown in the table below:

Primary Office Building Energy

Year	Primary Energy BTU/SF/Yr
1979	246,560
1989	238,200
1992	216,576
1995	227,238

The reduction in annual energy use per square foot does not seem in proportion to all the improvements in the energy efficiency of building components. Indeed, the estimated annual primary energy used per square foot is higher in 1995 than it was in 1992.

5. Calculated from Table 3.2 of the 1992 CGECS Survey found at <ftp.eia.doe.gov.pub/consumption/commercial/cbcetb02.pdf> and from the 1995 CBECS Survey, found at <ftp.eia.doe.gov.pub/consumption/commercial /c95tbl1.pdf>, and from Tables C9.79p and C9.89p in "Buildings and Energy in the 1980s."All of these tables are accessible from<www.eia.doe.gov/emeu/cbecs/contents.html>

The reduction in total commercial building energy use between 1976 and 1995 has remained flat[6], with more commercial space being added while total energy use remained about the same[7], which is not sustainable. The addition of floor space eroded the energy savings from improved efficiency.

Improving the Efficiency of Automobiles

After the gasoline price shocks of the mid and late 1970s, we quickly adopted more efficient technologies from foreign countries with car re-design influenced by international competition and higher gasoline prices.

Since then, engines have been improved with lighter aluminum blocks, fuel injection, turbocharging, overhead cams, better carburetors, emission and automatic speed controls. Car manufacturers introduced V6 and V4 engines, multi-speed automatic transmissions with electronic controls, and torque converter lockups to prevent slippage. We transversed the direction of motor rotation match the rotation of the wheels. We can now use unleaded fuel and get the punch of fuels with lead, with catalytic converters whose effectiveness is measured by mandated periodic emissions tests.

The bodies and frames of our cars have become lighter, smaller and more unified. They have are lighter by plastics and fiberglass shaped into aerodynamic forms. We have more dependable steel belted radial tires, front wheel drive and disk brakes with antilock features. We have sealed beam halogen lighting, and now, light emitting diodes.

Since 1970, we completed many interstate highway systems, and introduced 55mph speed limits, CAFE Standards, Right Turn on Red, carpooling, and, most recently, the internet, email, telecommuting and instantaneous information about traffic conditions. All of this should have reduced our gasoline consumption.

According to Table 2.9 of the *1998 Annual Energy Review*, the average miles per gallon of American cars has improved from 14.1 in 1967 to 21.5 in 1997, which is a 52% improvement due to improved efficiency.[8]

In addition to providing driven miles, the power from our car engines is used for many added benefits such as power steering, air conditioning, power brakes, power locks, power windows, power seats, power mirrors, and 4-wheel drive options. We can have automatic temperature control, rear window electric defrost and compressor driven front windshield defrost systems that allow us to keep our windows shut. Our cars now carry air bags and seat belts. We can have added weight of larger fuel tanks and radios with stereo, tape and compact disk players, car telephones and televisions. In addition to the amenities that use power for other than moving our cars efficiently, the number of single-occupancy vehicles has increased 16% from 1977 to 1990[9], eroding more of the savings from energy efficiency improvements.

Miles driven per car increased from 9,849 per year in 1967 to 11,575 in 1997, subtracting another 18% of the possible energy savings from improved efficiency.[8]

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6. <www.eia.doe.gov/emeu/cbecs/c&e_rept.html> Figure 6.
7. www.eia.doe.gov/emeu/consumptionbriefs/cbecs/cbecs_trends/main_menu.html
8. Table 2.9 of the *1998 Annual Energy Review*, DOE/EIA

The number of American citizens per cars-owned declined 16% from 1970 to 1995.[10] And the additional cars we are purchasing are filled with even more salable amenities. Sport utility vehicles are examples of cars with greater weight, volume and height. If you count all these benefits -- plus feelings of status, safety, power and the seeming mastery of hostile terrain -- SUVs present many more benefits in relation to their cost.

Also, the December 27, 1999 *New York Times* reported that "Between 1980 and 1992, the percentage of interstate drivers exceeding 65mph more than quadrupled, to nearly 23 percent from 4.9 percent, according to Federal Highway Administration data." Faster driving decreases efficiency.

These personal preferences, which are exempt from the efficiency ratio of miles per gallon, erode the improved efficiency completely. While gallons per car per year declined 27% since 1970[8], we inhale 29% more exhaust from gasoline combusted by our cars.[10]

So, the result after improved automobile efficiency is even more environmentally detrimental than with office buildings. Personal preference and behaviors erase the energy savings from improved efficiency.

Exporting Efficiency

The conclusions from these two examples are:

a. We have succeeded in improving the efficiency of the components of commercial buildings and automobiles.
b. There were no savings in gross use of non-renewable energy.
c. Therefore, improved efficiency does not lead to sustainability.
d. We should not export our concept of efficiency until we find its proper place in reducing gross energy use.

World energy consumption has increased 70% since 1971.[11] In 1970 the world had slightly less than 200 million cars. By 1994 we had 400 million.[12] Since America uses the most energy per capita of any nation, we should not set the energy standards for the rest of the world, which uses less per capita energy than we do.

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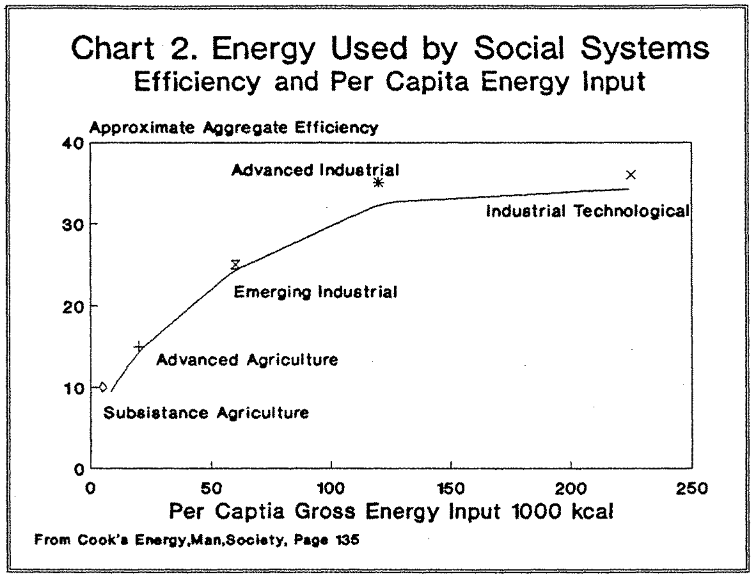
9. Table 2.9 of the *1998 Annual Energy Review*, DOE/EIA

10. US Department of Transportation, Federal Highway Administration, *Nationwide Personal Transportation Survey, 1990 NPTS Databook,* Volume II, FHWA-PL-94, Washington, DC 994, p. 7-6

11. 1999 Statistical Abstract --Tables 26 and 1032 <www.census.gov/prod/99pubs/99statab/sec01.pdf>

12. International Energy Agency, *World Energy Outlook 1996* (OECD, Paris, 1996) Pages 237-285.

Chart 2 estimates that improving the energy efficiency of a nation by just 3% from an advanced industrial nation to an industrial technological nation like ours, takes an 88% increase in per capita gross energy input.



In the book[13] from which this chart was taken, Professor Earl Cook from Texas A&M describes the differences between low-energy and high-energy societies. Parts of the following have been copied or summarized from his book:

> Time in a low-energy society tends to be cyclical instead of linear. Reasoning about the world tends to be highly inductive, based on interpretations of what can be seen, felt, tasted and smelled. In a low-energy agricultural society the moneylender is a symbol of disaster. The energy of low-energy societies comes mainly from plants and animals: food and wood, vegetable wastes and dung, animal and human power. These sources of energy are all renewable.
>
> The diet in a low-energy agricultural society tends to be low in animal products and rich in starches. The values of a high-energy society are oriented toward goods. Merit is a function of productivity and is given prime weight in choosing persons for positions in economic and political structures.
>
> It is doubtful that industrial society could have arisen in a society that did not practice slavery or serfdom, in which the primary energy flow was controlled so that a surplus was assured for the managers. Timetables and clocks are vital. Life may be inconvenienced by the seasons and made less productive by the inefficiencies of infancy and old age.
>
> The communications media, needed to carry out the affairs of a high-energy society, provide the means for stimulating consumption by influencing belief in the potential rewards of specified products.

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13. Earl Cook, *Man, Energy, Society*, San Francisco: Freeman, 1976 ISBN 0716707241

People in low-energy societies try to keep warm by wearing more clothes and to keep cool by shedding them. People in high-energy societies keep warm or cool by heating or cooling their buildings and conveyances.

What advances in public health practices and medical engineering should have gained for the adult of the high-energy society seems to have been nullified by the citizen's own eating habits and increasingly sedentary lifestyle.

Restating these descriptions in other terms, high energy society is associated with stressful timekeeping, reliance on credit (with associated bankruptcies), use of non-renewable energy, diets high in animal fats, isolation of the elderly, concentration on materialism, whole building air conditioning, and so on.

Yet, does using more energy make us happier? Since those promoting energy efficiency ascribe its positive relationship to prosperity, and because high-energy societies tend to be more prosperous societies, per capita income is positively related to the efficient use of non-renewable energy. In a analysis of opinions from people in 43 different countries, the World Values Survey has determined that "Above a threshold of about $6,000 (in 1991 dollars), there is virtually no relationship between wealth and subjective well-being."[14] Therefore, we cannot offer positive energy efficiency recommendations to low-energy nations that will improve their well being. We have, on the other hand, every indication that their lifestyles will become as efficient, stressed and unsustainable as the American lifestyle.

Solutions

Following are several solutions to create a sustainable energy future for both the United States and other countries:

First, we should value any improvements to end use efficiency according to related gross per capita energy reductions. At the same time, we should not excuse increases in energy use merely because they increase per capita wealth. Our environment does not respond favorably to mere increases in wealth, but rather to less pollution.

Second, we should mature our hubris of exporting energy efficiency to nations that use less energy per capita than we do. Instead, we should emulate their methods and behaviors that allow them to prosper sustainably without using as much energy as we do. We should not justify increased energy use to compete successfully in our global economy. Our environment does not respond favorably to successful global competition between transnational corporations, but rather to less gross use of non-renewable energy.

Third, we should not devalue the behavioral choices which not only avoid using energy efficiently, but which avoid the efficient use of energy as well. Our environment does not respond to market share of efficient end uses; it responds to less pollution from less gross use of non-renewable energy. We saw a glimmer of the attitude that behavior was

14. Inglehart, Ronald. *Modernization and Postmodernization. Cultural, Economic and Political Change in 43 Societies.* New Jersey, Princeton University Press, 1997. ISBN 069101180X.

most important in the late 1970s to mid 1980s – the era when our per capita energy use declined. For that brief period in American energy history, we had Princeton University students studying identical houses to show that half the changes in energy use were due to the behavior of the occupants. Some chefs prepared identical meals on the same stove using a third of the energy of their colleagues, and the following two examples are copied from their references.

> In 1980, the host of a popular television campaign in Israel asked the audience to turn off all the extra lights in their homes. The viewers then saw the effect of their actions on their screen as a camera focused on the Israeli Electric Company's electricity-consumption gauges. Within a few seconds, the gauges dropped sharply. One estimate was that the collective behavior saved Israel 6% in aggregate electricity consumption during the 8 months of the campaign.[15]

> In December 1973 the Los Angeles Department of Water and Power, through an ad hoc committee, representing a broad coalition of civic, business, and labor leaders set mandatory targets for reductions for all customers but left it to the customers themselves to implement the specific cuts.
>
> And so, in mid-December, the city council adopted an Emergency Energy Curtailment Plan, the purpose of which was to "significantly reduce the consumption of electricity over an extended period of time, thereby extending the available fuel required for the production of electricity, while reducing the hardships on the city and the general public to the greatest possible extent." The penalty for non-compliance was a 50 percent surcharge on the entire bill. The aim was to reduce the city's total electricity consumption by 12 percent. The measured reductions were Residential, 18%; Industrial, 11%; and Commercial, 28%. Much of the adjustment in commercial establishments, which accounted for 50 percent of electricity usage prior to the cutback, was done mostly through better control of lighting and air-conditioning.
>
> In May 1974, two months after the Arab embargo was lifted, the program was suspended, but its impact could still be felt a year later; in May of 1975, the total electricity sales were 8 percent lower than the 1973 level. In addition, there had been a far greater reduction in DWP consumption than in that of the three other largest electric utilities in California, none of which had adopted such a program.[16]

Therefore, as these examples show, the US government could promote using less energy in the same way they promote behavioral restraint through such programs as "Just Say No to Forest Fires" and "Give a Hoot, Don't Pollute."

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15. Kotler, Philip. *Social Marketing*. New York: 1989. ISBN 0029184614 Pages 102 and 154
16. Stobaugh, Robert and Yergin, Daniel, editors. *Energy Future*. New York: Ballentine Books, 1979, Page 176

Fourth, we should describe relationships to fuel and electricity as addictions. During electric blackouts, Americans are seemingly helpless. In 1970, the American household had a variety of activities that were independent of electricity or fuel. As we became more efficient, our basic residential needs required more electricity. Now, the benefits derived from entertainment, communication, security and comfort **require** electricity. And our electricity has to be high quality so that surges, poor power quality, and interruptions are minimized. Almost all of our transportation now requires gasoline. Similarly, sidewalks, bike paths, light rail, and buses are afterthoughts in modern residential developments.

Nearly every activity seems to depend on car transport. If we treat gasoline as an addictive, harmful commodity, we would prohibit deceptive automobile advertisements[17], just as we do smoking, and we would tax gasoline as heavily as we tax tobacco and liquor.

Finally, since energy taxes are not popular, we should consider class action lawsuits against those who are selling products that increase atmospheric pollution – automobile manufacturers[18], electric utilities, and others. Such suits follow the example of our relationships to cigarette and gun manufacturers and could include those who promote efficient energy use, knowing that it will result in greater use of non-renewable energy.

For all these reasons, we should change our message and goal from "Use Energy Efficiently" to "Use Less Energy".

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17. See Federal Trade Commission publication 018-000-00-253-1 from June 1979 which cites how the FTC ruled against Standard Oil of California's attempt to exploit public anxieties about pollution. See also FTC's website for advice on "Sorting Out 'Green' Advertising Claims."

18. See the William C. Ford Jr.'s analogy between the reputation of automakers who ignore the environmental harm of sport utility vehicles and the sullied reputation of big tobacco companies in the *New York Times*, May 12, 2000.