



The Community SolutionSM

New Solutions

Community, a solution for saving the environment and conserving resources with equity for all.

Plan C – Curtailment and Community

The triple threats of peal oil, climate change and increasing inequity are growing in intensity at a shocking rate. We are bombarded with disturbing news including threats of war and even preemptive nuclear attack. We are told that China is a threat to our survival because it is attempting to mimic the American lifestyle. Al Gore’s movie “An Inconvenient Truth” suggests that our very survival is at stake from global warming. The handwriting is on the wall – massive change is in the offing – and we are totally unprepared. For this New Solutions we will discuss options for addressing these threats under the rubric of four “plans” arbitrarily labeled A, B, C and D. The alternative we propose, Plan C, is to tackle the issues of food, housing and transportation, preparing for a world of greatly reduced fossil fuel consumption.

Plan A - Business as Usual

Plan “A” is the most widely discussed option concerning energy depletion and climate change. It is often called the “business as usual” plan. It represents the growth-oriented paradigm including the obsession with scientific technology that has driven Western society for 60 years and much of the rest of the world for a lesser period. Individual self interest is its underlying philosophy and its basic thesis is the capitalistic doctrine of “substitution,” which means that we can never run out of a



Plan A: Keep Consuming

Use anything that burns for fuel; global warming and pollution are not a problem (note: evolves to Plan D).

resource because the free market will always find an alternative; i.e. technology will always find a solution to every problem.

This theory treats the natural world as a “sink,” the term used to describe the process of dumping the refuse, toxins and waste of manufactured goods and services into the air and water, as well as in and on the land. Extreme Plan A proponents argue for burning anything that will burn to generate energy, regardless of the consequences. Included among the proponents of this plan are the leaders of most major manufacturing corporations, fossil fuel companies, utility companies and the president of the United States.

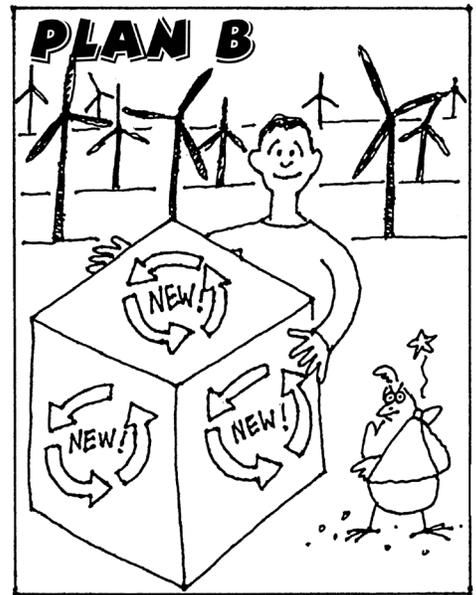
The fuel sources for Plan A technology are largely non-renewable, mostly oil, natural gas, coal and uranium. Future non-renewable fuels are lower quality versions of oil, such as tar sands and oil shale in the U.S. and Canada, and the heavy oils of the Athabasca region of Venezuela. A sizable majority of the population of the U.S. has put its trust in Plan A and a continuing flow of oil from the Middle East, domestic natural gas and tar sands from Canada.

Plan B - Clean/Green Technology

Plan B proponents can be described as advocates of “clean or green” technology. Plan B advocates are more or less happy with the status quo, particularly their

lifestyle, and hope to simply replace non-renewable energy products with renewable ones. (This designation is not based on the book Plan B 2.0 by Lester Brown nor do the comments we make here about Plan B necessarily apply to him.)¹

Plan B supporters generally accept the capitalist system and the underlying values of competition and growth. Their mantra is, “Green/clean technology is here! It just needs to be deployed.” Frequently statements are made against corporations and government, accusing them of deliberate efforts to hold such technologies off the market.



Plan B: Keep Consuming

New energy alternatives will save us; per capita use of fossil fuels continues upward along with population and CO₂ emissions (note: still evolves to Plan D albeit a bit more slowly).

Representatives of this group include former vice president Al Gore and most environmentalists and organizations that support wilderness, as well as solar, wind and biofuel corporations. Ethanol and wind turbines are popular with Plan B-oriented people. The environmental

movement is the largest identifiable population that supports some version of Plan B. Plan B proponents also feel that efficiency is a key component of their strategy. They typically do not accept Jevons' Paradox, which says that consumption increases as a function of efficiency.

The overriding majority of Americans, well over 90 percent, believe in either Plan A or Plan B. They share basic consumer values and their preferred energy projects sometimes overlap. Al Gore's movie, *The Inconvenient Truth*, advocates for carbon sequestration, popular with utilities and oil companies. This technology will supposedly keep the increased burning of coal from speeding up global warming by burying (sequestering) the deadly CO₂ emissions in the ground, the ocean, etc. Biofuels are a component of Plan B and are supported by large agribusiness companies such as Arthur Daniel Midlands and Cargill, the large suppliers of ethanol and bio-diesel, using natural gas-based fertilizers and other fossil fuels to grow corn and soybeans.

Plan A and B types do not see any particular action to be done by consumers. For them, it is the responsibility of government and corporations to make the necessary changes. They do not hold themselves accountable for the energy crisis nor responsible for the poor choices made.

Plan D – Die Off

Those who expect Plan D believe it is too late to avoid catastrophe. These people tend to be very discouraged by our energy and climate change problems. The scenario is associated with the term "Die-off" – thus Plan "D."

Plan D assumes there is no viable solution to peak oil and climate change, that economic growth, population and consumption will continue to increase unabated and that mankind can expect economic collapse, chaos, wars and other forms of violence – possibly even mass starvation. They tend to focus on individual and family survival and the need for defense of whatever sustainable communities can be formed.

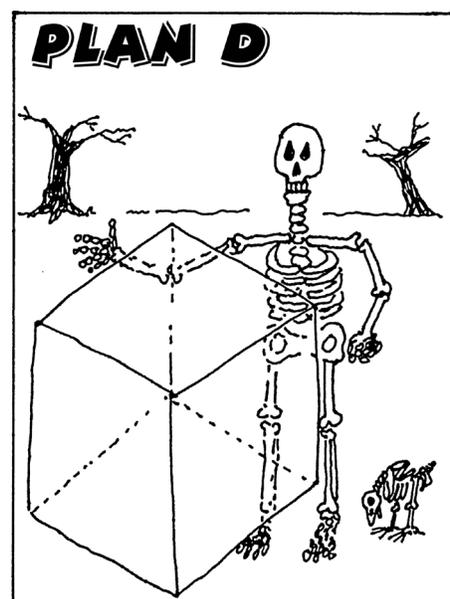
Some dismiss this view with a few flip

remarks, but there is reason to take it seriously – a major population die-off is not out of the question. Wars over dwindling fossil fuels, possibly involving nuclear weapons, are only the most precipitous events that could occur. The effects of climate change on agriculture, exacerbated by the loss of fossil fuel inputs could result in widespread hunger and unrest. We have passed the carrying capacity of the planet and remedies are not at all obvious. A negative perspective is not an unfounded one.

Plan C - Curtailment and Community

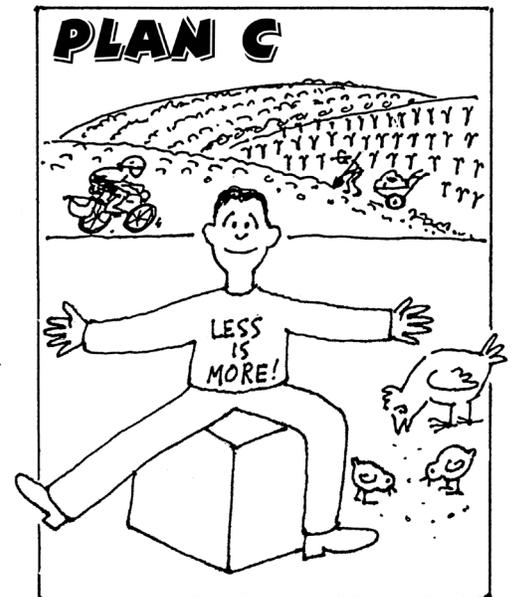
Plan C differs from Plans A and B by assuming that the relatively recent availability (a blip in geological time) of fossil fuel energy has caused a temporary detour in the evolution of humankind. Fossil fuels have led to a two-century long addictive fascination with oil-based technology and machines, which in the future can no longer be sustained.

Under Plan C, the first priority for society as a whole is to drastically reduce our consumption of fossil fuel energy and products derived from it. We must "curtail." That means buying less, using less, wanting less and wasting less. Curtail means to "cut back" or possibly to "downsize." It is more



Plan D: Die Off

Humanity – a blip in geologic time; resources depleted, a heated globe finishes us off.



Plan C: Curtailment and Community

Consume less, grown your own food, live well; a sustainable, sociable existence.

reflective of the seriousness of our current situation than the probably more politically acceptable word "conserve." Conservation often implies a relatively small reduction in consumption, possibly recycling or buying compact fluorescents or maybe buying a hybrid car. If conserve is to be used as a synonym for curtail, it would be appropriate to preface it with some modifier such as "radical" conservation or "extreme" conservation or "rapid" conservation.

Plan C also implies massive and permanent societal changes. A major restructuring of our society will need to take place. It requires reducing our consumption of fuels, minerals and plants as well as wasteful use of water. We must abandon the "American Way of Life" and reduce our "standard of living." Shortly after his 1980 election, President Ronald Reagan gave a speech in which he equated conservation with being cold in winter and hot in summer, and vowed to spare Americans that fate.² Twenty-five years later, we are beginning to realize that the attempt to keep people from experiencing the physical reality of living on the planet has led us to a point where "being cold in winter" and "hot in summer" may be only a small part of the stresses we will be facing. Survival, rather than comfort, could be the question of the day.

What do we mean by curtailment and how could it be measured? The concept of Peak Oil, the year of world maximum production of oil, has introduced new frames of reference on which to measure our way-of-life. One of the most important is to understand that pollution, in most of its varied forms, is a byproduct of the inordinate consumption of the various fossil fuels. Carbon dioxide (CO₂), the gas which is most damaging to the atmosphere, is simply the result of fossil fuel burning.

Much of the waste in our landfills comes from products made from fossil fuels, such as plastics, or products made using large amounts of fossil fuel generated energy, such as paper and glass. Sewage pollutants come from a concentration of fecal material from cattle feed lots and people in cities – material that should be used to nourish the land that provides our food. What we call sewage, properly handled, is food for plants; placing it in waterways makes it a biological pollutant.

One might designate Plan C people as conservers rather than consumers. Such people are much fewer in numbers than the Plan A or Plan B supporters. The seeds of this “conservator movement” come from a few thousand people, not millions.

Thinking Globally

The popular phrase, “Think Globally, Act Locally,” is catchy but we need to consider the context in which the phrase is used and whether or not the local actions have real significance. Corporations in this country and the world have a way of taking concepts that were developed at the grass roots level, and then adapting them to manipulate people.

Some Global Thoughts that stimulate Local Actions are frivolous and largely irrelevant, such as clothing styles and car models. Others are concerned and well-meaning, but may be largely ineffectual, serving mostly to make us feel better, such as choosing between paper and plastic bags. Some may be actions stimulated by ad campaigns, solely designed to make us feel good about the products of a corporation.

“Globalization,” one widely discussed Global Thought, is mostly about large corporations moving manufacturing facilities around the world to obtain the cheapest

labor rates while minimizing the environmental and labor constraints imposed by elected governments. To a large extent globalization contributes to environmental degradation, increasing inequity (the breeding ground of terrorism) and excess energy consumption. Thus, globalization is largely contrary to the interests of local communities. A corporation’s Global Thoughts most likely have little to do with the well being of people anywhere and a lot to do with its shareholders’ profits.

If we are Thinking Globally and Acting Locally, we should be able to quickly move from a Global Thought to one or more relevant Local Actions. In terms of corporate globalization the local action might be to avoid purchasing goods from international corporations as much as possible. With this in mind, three of the most important things we should be Thinking Globally about are:

1. Excessive use of declining fossil fuels
2. Increasing climate deterioration
3. Increasing economic inequity

Water scarcity and hunger are important but for this paper we will consider them to be secondary effects. Groups that have little access to fossil fuels tend to have high rates of hunger, while those with access to large amounts of fossil fuel tend to be overweight.

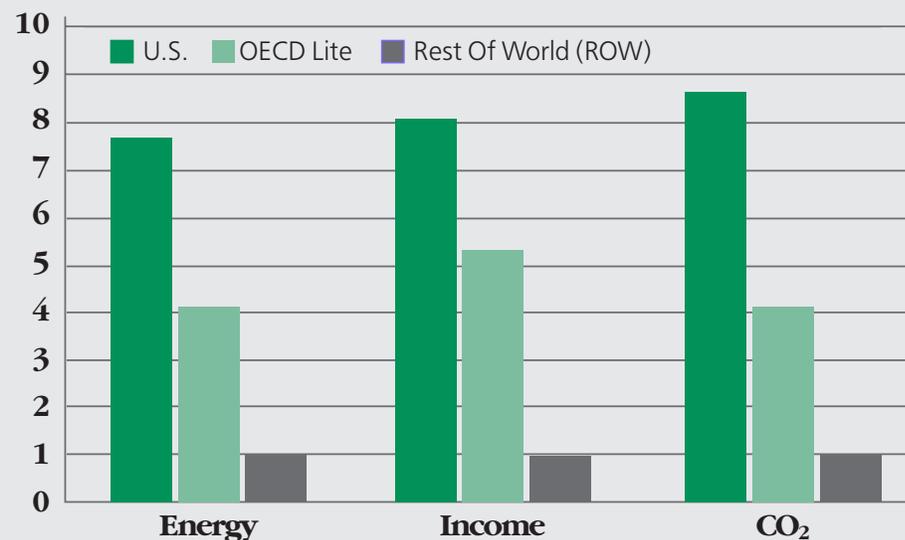
Awareness of global inequity means knowing that the majority of the world’s people are living in poverty and that a significant number are near death from starvation. Surely this is a more important global thought than, for instance, what country fields the best soccer team, or even who should be allowed to join the World Trade Organization.

A Global Relationship

It is easy to understand that fuel consumption is related to pollution. Every chemist and physicist knows that burning hydrocarbons (HxCy) in air leads to the release of heat energy and CO₂ caused by the carbon interacting with the oxygen in the air. A less well understood global thought is that fossil fuel consumption is linked to wealth. Few economists appear to understand the relationship between fossil fuel distribution and poverty. Figure 1 depicts a very simple, but highly relevant, world view (or global thought). It implies a simple relationship: income = fossil fuel energy consumption = CO₂ pollution.³

This figure shows the world population divided into three groupings – U.S., OECD-L and ROW. It then shows the relationship between these three groups relative to income, energy and CO₂ gener-

Figure 1: Energy = Income = Pollution



Per capita, people in the U.S. use about eight times the energy, have about eight times the income and purchasing power and release an even greater proportion of CO₂ into the air as do the people of the Rest of the World.

ated. The U.S. population is 300 million people, roughly 5 percent of the world population. It is the most heavily industrialized nation.

The second level of industrialized society includes most members of the Organization for Economic Cooperation and Development (OECD). The designation OECD-L (for OECD “light”), reflects placing the U.S. in its own separate category and placing Mexico and Turkey with the third world nations. This second grouping contains roughly 10 percent of the world population, about 600 million people. It includes Western Europe along with Canada and the industrial counties of Asia – Japan, South Korea, Australia and New Zealand.

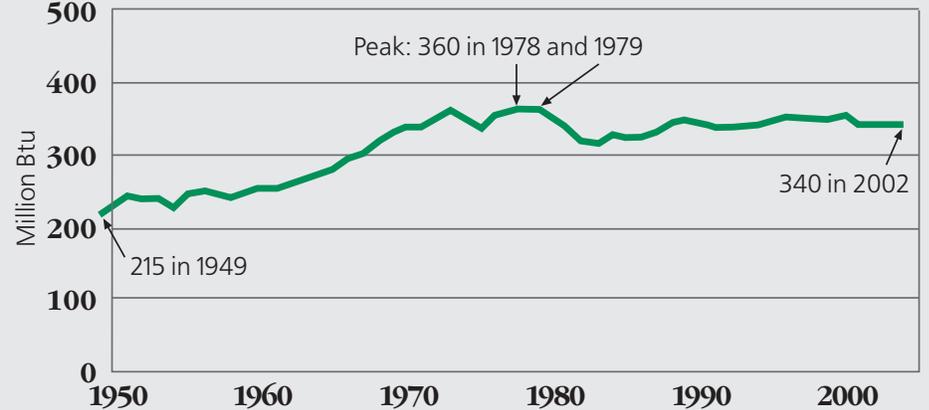
The remainder of the world, which we refer to as ROW or “Rest of the World” has a population of 5,400 million – 85 percent of the population of the world. This part of the world is often called the “third world” or “the developing world.” The U.S. and OECD-L are designated “first world” or “developed world.” Another designation could be “the rich world” and “the poor world.”

In this chart the ROW is normalized to 1 for each of the three categories. (Normalization is done by dividing all three categories by the value of the ROW category.) The vertical bars that represent the U.S. and OECD-L are thus multiples of the normalized ROW. This graph shows that the ratios between the U.S., OECD-L and ROW for the three categories are roughly equal, implying a correlation between energy consumed, income and CO₂ generated.

This view might be criticized as too simplistic.⁴ But our fundamental modern creed is summarized in the catch phrases – “Cheap energy fuels our economy” and “Our economy runs on oil (or coal or natural gas).” It was in vogue in the late 1990s to say that our economy was an “information economy.” Yet our fuel consumption per capita has not deviated for a very long time, as illustrated in Figure 2, which shows the per capita use of energy in the U.S.⁵

Where would our information economy

Figure 2: Per Capita Energy Usage in the U.S.



Despite a shift from manufacturing to services, our consumption of energy has not declined.

be if we were without electricity for our computers for a week? There would be chaos. And if we “turned off” our transportation or our furnaces, refrigerators, etc., there would also be chaos – and hunger. We have created a society where fossil fuel energy is life itself. If we withdrew the ten calories of fossil fuels used to grow each calorie of food energy we consume, then we would have mass starvation. We would be a poor third world country very quickly.

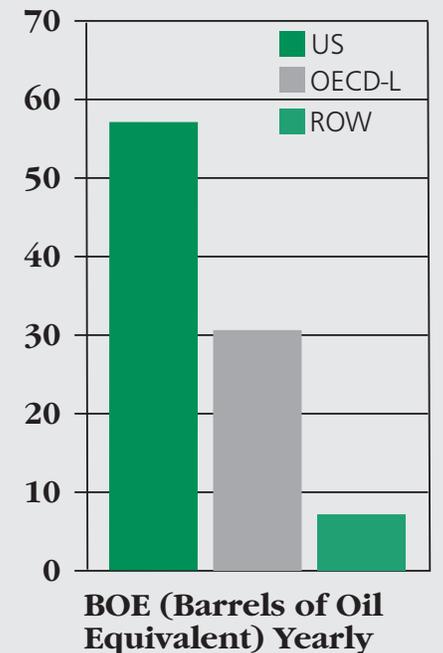
The frequent reference to ourselves as consumers, as opposed to national or world citizens or brothers and sisters or neighbors (or, perish the thought – comrades) is a reminder that our current economic system depends on our consuming copious amounts of fossil fuel energy. We are thus encouraged to measure our well being in terms of consumption.

It is useful to understand just how much energy each person in the U.S. uses, particularly in comparison with the rest of the world.⁶ Each person in the U.S. consumes 57.5 Barrels of Oil Equivalent (BOE) each year (Figure 3). The citizens of the OECD-L nations each consume 30.6 BOE yearly and the 85 percent of the people in the ROW countries consume 7.3 BOE per person per year. Each person in the U.S. consumes about 8 times the amount of fossil fuel consumed by the average person in the third world.

The combined consumption of the U.S. and OECD-L is 38.6 BOE annually. Thus

the “developed” nations, about 1 billion people, consume 5 times the energy per capita of the 5.4 billion people who populate the rest of the world. This difference is leading to more and more resentment amongst the poor of the world, and could well become the basis for world conflict and war.

Figure 3: Comparison of per Capita Energy Use



The U.S. uses nearly twice as much energy per capita as the other “developed” countries whose lifestyles are at least equal to ours.

Looking at U.S. Consumption

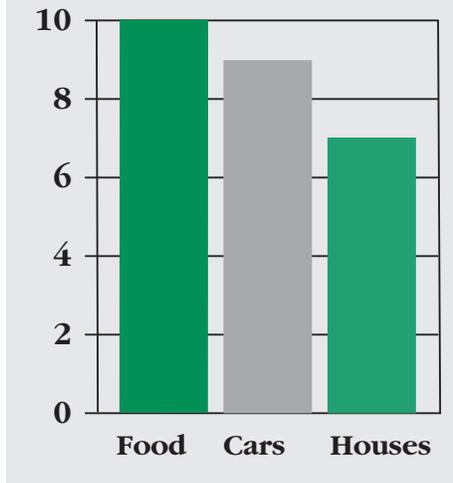
“Thinking globally,” we understand that the U.S. is consuming far more energy (as well as all other goods) than any other nation. It is useful to divide the U.S. energy consumption further. Part of the 57.5 BOE consumed is under the direct control of each individual and part of it is not. For example, each person can choose the type of car to drive and the kind of home in which to live. One could buy a Honda Insight that gets 60 miles per gallon or a GM Hummer that gets 10 miles per gallon. Or one could buy a large home with lots of glass and high ceilings or a small home designed to conserve energy. One can eat foods that are transported long distances, sometimes by air, or eat foods that are grown close to home.

As shown in Figure 4, of the yearly 57.5 BOE used per person, about ten BOE is used for food production, eight BOE is consumed operating our cars, and seven BOE is used for lights, heat, cooling and appliances in our homes. This is about half the total. The rest includes the energy to build and operate commercial buildings, industrial buildings, retail outlets, schools, nursing homes and a variety of other structures. It also includes the energy cost to build and maintain our highway system as well as the transportation fuel costs for air, shipping and rail.

Many of these costs are not directly controllable by the average person since they are the responsibility of government institutions and corporations. A great deal of this expenditure takes place in each person’s work facility and is under control of our employers. Each person has little control over these expenditures but a high degree of control over the 27 or so BOE for food, housing and car, which is about half the total energy consumed per year.

The part of the expenditures that are not under direct control of the average person in the three areas mentioned is nonetheless dependent on the consumer. For example, choosing to ride the bus rather than driving a car would impact the transportation industry. Likewise, if we reduce our consumption of furnishings for our sizable

Figure 4: U.S. Per Person BOE Used (yearly)



Of the 57.5 BOE used per capita in the U.S., nearly half is within our direct control.

homes and a multitude of other manufactured goods, there will be an impact on the industries that produce those goods.

Simply put, if we concentrate on the areas within our control and begin to reduce the BOE we consume for food, car and home, there will be a corresponding reduction in the industrial BOE consumed, thus affecting the total BOE consumption.

A saner life with a focus on family, friends and community, together with a

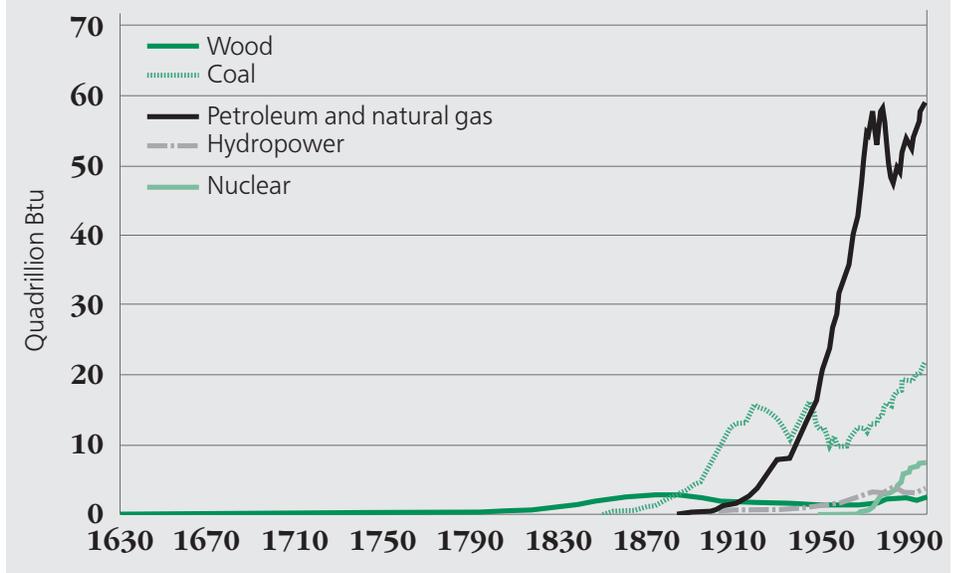
commitment to “walking lightly on the earth” might result in the emptying of the skyscrapers of Manhattan as our culture moves away from its current focus on wealth, investment and deal-making.

Reviewing Energy Options

A global view should also include a historical view. We need to think comprehensively in both space and time.⁷ Human beings lived in a sustainable manner for many millennia. A few centuries ago new sources of non-renewable energy were discovered, starting with coal, followed by oil and natural gas and then by uranium (see Figure 5). The standard of living increased rapidly for a very small part of the world’s population. And the population began growing. When cheap and easy fossil fuels became available, the value system of humanity moved away from a community relationship orientation toward the acquisition and consumption of material goods.

Today the primary goal of most people is to consume fossil fuels in the largest quantities that their incomes will allow. The right to the “pursuit of happiness” is guaranteed by our constitution. And the fundamental belief of our modern culture is that “happiness” comes from an increased standard of living, which essentially is

Figure 5: U.S. Consumption by Resource



With fossil fuels, our values changed, from community to consumption.

increased consumption of fossil fuels and their products.

Our “way of life” is based on using up the remaining fossil fuels by operating a huge variety of machines, including cars and houses stuffed with appliances. At the same time we are eating excessive quantities of food that require 10 calories of fossil fuels for every calorie of food energy provided. This might be sustainable if fossil fuels were infinite and if the atmosphere could absorb all the pollution, primarily CO₂, and remain stable. But this is not the case.

Two often overlooked aspects of energy alternatives are, first, the limited number of options available, and second, the decades that they have been under development. There is nothing currently being proposed that was not proposed first in the 1970s. The unwritten and unsaid fact is that there is no replacement or substitute for fossil fuels. We chose optimizations of the existing fuels and a drive for more efficient machines because this allowed us to continue to consume.

Curtailment means the economy stops growing and begins contracting and a contracting economy means fewer goods and services and more limited choices. For Americans this is the opposite of success – it is failure.

New options are just derivatives of things that have been around for a very long time, such as battery-driven cars or alcohol from food crops. The mantra of our leaders now (looking somewhat dated since it was first stated in the 1970s) is that we must “buy time” until some new discovery can be made. Few point out that we have not discovered any new elements. Carbon and hydrogen have not been superseded by the mythical kryptonite of Superman comics or the fantasy “dilithium crystals” of Star Trek spaceships.

Alternatives to fossil fuels have a much lower Energy Return on Energy Invested (ERORI) and cannot sustain the level of consumption to which we are accustomed. Most people will ignore this, searching the headlines of the paper or frantically surfing the Internet looking for a break-

through or just choosing to believe optimistic statements from corporations, governments and media. As time goes on, there will be an increasing awareness that our sole option is to go from a growing economy to a contracting economy. Eventually we will curtail our expenditures of fossil fuels because we will have no choice. The longer we wait, the greater the suffering of the poor of the U.S. and the rest of the world.

The Psychology of Curtailment

There is a vital psychological component to curtailment. To Americans, consuming more products and services is the critical measure of both national and personal success, even freedom. A growing economy means affluence, abundance, success and progress – the core values of the society. Curtailment means the economy stops growing and begins contracting and a contracting economy means fewer goods and services and more limited choices. For Americans this is the opposite of success – it is failure. This is the dissonant era we are now entering.

Slowly the American people must begin to realize that they have been and still are the leaders in global ecological destruction. We, the chosen people, are living in such an expensive and profligate way that we are destroying the habitability of our planet, and pushing the poor of the world to the edge of survival. Since making the planet uninhabitable is the ultimate failure, what will it take for us to view success differently?

If we choose consuming less, is there a way to manage and measure curtailment if it is inevitable? Even more important, are there models of what curtailment might be like? This leads to a secondary psychological shock. We must look to the rest of the world (ROW) for examples – the 85 percent of the world’s population who live on one-eighth the per capita consumption of people in the U.S. This 85 percent has lived much more frugally, within the constraint of a world of limits, than have the U.S. or European countries. It is not that they wisely chose this as an alternate path; most **would** prefer to adopt U.S. con-

sumption standards. But as energy supplies peak, the model of economic development that depends on perpetual growth (and increased consumption of fossil fuels and other resources) will have to be abandoned.

To avoid Plan D, the consuming, self-indulgent developed countries will necessarily have to make the most dramatic reductions in their consumption – towards the level of the third world. At present we are choosing war and the use of military power to continue consuming.

But other countries of the world can show us what life will be like after curtailment. If we curtail to the point of Europe – a 50 percent reduction of fossil fuel consumption – we will drive small cars that get 42 miles per gallon rather than the U.S. average of 21 mpg. We will live in houses that average 1,000 square feet in size rather than the U.S. standard of 2,000 square feet. As we curtail more, we will move from the private car to trains, buses or bicycles like third world countries. And our houses will shrink even further in size. They may also become multi-family buildings (much more common in the rest of the world) rather than single-family homes, a housing style that saves resources both in the process of building as well as in the operating of the building and its machinery.

We will eat differently. We will eat less food and much less meat. Most of our foods will be consumed in the time of year in which they are grown, that is, we will eat seasonally. Variety at particular times of the year will be limited. Highly processed food and factory freezing of food will decline. We will buy food from local growers.

We will not drive private cars as we do now. Public transportation in many forms will appear, displacing private transportation for the vast majority of people. We will walk more, bicycle a great deal more, ride in jitneys, buses and trains and hitchhike. Flying will be unavailable to the vast majority of the population. Over many decades train networks will be developed. Goods and services will be provided close to the consumer to minimize transportation fuel costs. Regional differences will return along with a stronger sense of community.

We also need to study the differences

between the poor countries of the world to learn what has worked and what hasn't. Much of the population of most third world countries is living in destitution, with minimal access to basic needs. Two significant populations are notable exceptions to this pattern, providing adequate food and housing and close to a first world level of education and health care on a third world level of income. They are the state of Kerala⁸ in south India and the country of Cuba. In the past their achievements have been at best curiosities to the rich world, but in the time to come they may be invaluable models to learn from.

To make these choices before they are forced upon us will require an enormous change in the nation's consciousness. We must go through the kind of transition that Germany did after World War II, when faced with the public knowledge of the Holocaust and other examples of mass murder. The people of that nation had to deal with the horror they had created. Similarly, the people of the U.S. will need to face the damage done by our culture of greed – the environmental damage and the waste of precious resources that should have been saved for future generations. We will have to live with the growing contempt of our children as they realize, with each new crisis, what we have done.

Giving Up Technology Worship

The most modern religion of our time (the basic religion of all other religions) is the belief in technology. It is vital to understand and accept that there is no new invention, technology or fuel on the horizon that can bail us out of our dilemma. The material prosperity we are used to is simply fossil fuel energy prosperity. Our infrastructure is a high energy one and is no longer viable. A reduction in energy means a reduction in the material standard of living. Any attempt to delay this, in the hope of some miracle that will eliminate the need to curtail, simply delays the actions we must all take – to reduce consumption. The cost in human suffering will increase the longer we delay.⁹

There are research labs with experts

that have been addressing energy for many decades. Oil, natural gas and coal companies have massive research staffs. Government and universities also have research staffs. Research and Development (R&D) for car companies on a worldwide basis is nearly \$40 billion yearly.¹⁰

These researchers have been seeking for new options in the past and will continue to do so in the future. We can expect to continue to get performance gains like the 1-2 percent per year efficiency improvement in car mileage. Aircraft manufacturers will continue to improve the performance of airplanes at a similar rate. These improvements will make little difference.

But all these efficiencies are predictable. Each industry has a long record of improvement and these records have included both the plodding work of what is termed "continuation engineering" along with breakthroughs that occur periodically. However, we must view this over a long time period. Many of the machine artifacts we have are quite mature. We can expect our cars of the future to have four wheels, an engine with a transmission, and a steering wheel. The car design is mature. The same holds true for all transportation vehicles.^{11, 12}

Unfortunately, this reality is obscured by the much more rapid improvements in electronics whose performance and efficiency has improved at a dramatically faster rate. But electronics has little to do with our ordinary consumption of energy for food, homes, and cars, plus all the physical experiences of a body living in a real world, not a virtual one. A PC that is a hundred times faster or an I-Pod with 10,000 songs will not bring us the option to continue our high-energy lifestyle. In spite of the advent of the so called "information economy" and all the hype of "knowledge industries," Americans continue to consume energy at an unsustainable level.

The choice is an obvious one for each of us. Each person must either assume a "technological fix" will be forthcoming and do nothing except monitor the media for more panaceas, or abandon that fantasy hope and begin the personal process of changing one's lifestyle. This is truly think-

ing globally – choosing a healthy planet and a sustainable lifestyle over the short-term pleasures of excessive consumption. Consumption as a way of being is doomed by the reality of Peak Oil and climate change. Choosing to reduce consumption is not going backwards. It will be coupled with innovative use of current technologies and improvements in machine efficiency. But these will be secondary.

Personal Change vs. Municipality Change

Community Solutions has long advocated a resurgence of small local communities, where smaller towns and villages are interspersed with reasonably sized cities – cities far below the scale of the current ones. Since World War II there has been a continuous population movement from rural areas to urban cities. According to Worldwatch,¹³ in the year 2007 more people will live in urban areas of the world than in rural areas, marking a key milestone. The same report notes that one in three of these urbanites lives in a slum.

Urbanization has been "sold" as one of the benefits of economic growth and globalization. But this is not necessarily what people want. A Gallup pole conducted in 1989 asked the question, "What kind of place do you want to live in?" The answers given showed the following distribution: Small Town – 35 percent, Suburb – 24 percent, Farm – 22 percent, City – 19 percent. In the book "The Second Coming of the American Small Town" the small town is viewed as the best place to raise children. Note that the 22 percent who chose "farm" is close to the percentage of the work force that would be required to provide locally grown organic food versus the 2 percent of the work force currently assigned to industrial food production. This implies there are many people who are unable to pursue their preferred vocation of farming, having been replaced by subsidized factory farms run on non-renewable fossil fuels.

The concepts of developing small local communities and local economies have become popular options to those seeing a new future after Peak Oil. Books and

conferences abound on these topics. But this “localization” movement must be careful not to fall into the trap of the Plan B option – an option which lacks a perspective of the need for limits – and which hopes for a solution to support our current lifestyle.

There is also a risk that people will focus on municipal use of fossil fuels and ignore their own personal consumption of energy. Too often the focus of a relocalization effort is on reviewing information about a municipality. But the expenditures of a town or city are small compared to the expenditures of its citizenry. It matters little what kind of bus or police car is purchased. A small town will have a dozen public vehicles but thousands of commuter cars. We must move to smaller communities and local economies to live with less energy. But the move must begin with personal changes.

Personal Impact on Institutional Energy Use

Figure 6 combines two previous charts and adds U.S. Government and Corporations energy consumption. Figure 3 (page 4) showed the inordinate amount of energy used by the average U.S. citizen compared to other OECD nations and the 85% of the people in the rest of the world. Figure 4 (page 5) showed the personal energy consumption of each person for food, cars and housing. Figure 6 illustrates the distribution of energy in the world (three columns on the left) as well as a more detailed breakdown of U.S. consumption (4 columns on the right). U.S. consumption is divided into four categories:

1. Per capita food energy use
2. Per capita automobile energy use
3. Per capita home energy use
4. U.S. Corporation, government and other institutional usage

This chart is significant in that it shows the energy used for just a few of our essentials compared to the total energy used in the ROW countries. Note that the energy consumed in each of the U.S. categories of food, cars and houses is equal to or greater than the total energy consumed in the

ROW countries. This illustrates the excessive and wasteful energy consumption in our culture.

The column entitled “U.S. Corp/Gov” shows the energy consumption that is not under our personal control. As pointed out earlier, the total of food, cars, and home is about half the total consumption. But, as stated, our personal consumption is not independent from U.S. Corp/Gov expenditures. A reduction in personal consumption in food, cars and housing will affect the corporate/government area. The significance of this is that it means our personal level of energy use controls the corporate and governmental levels of energy consumption.

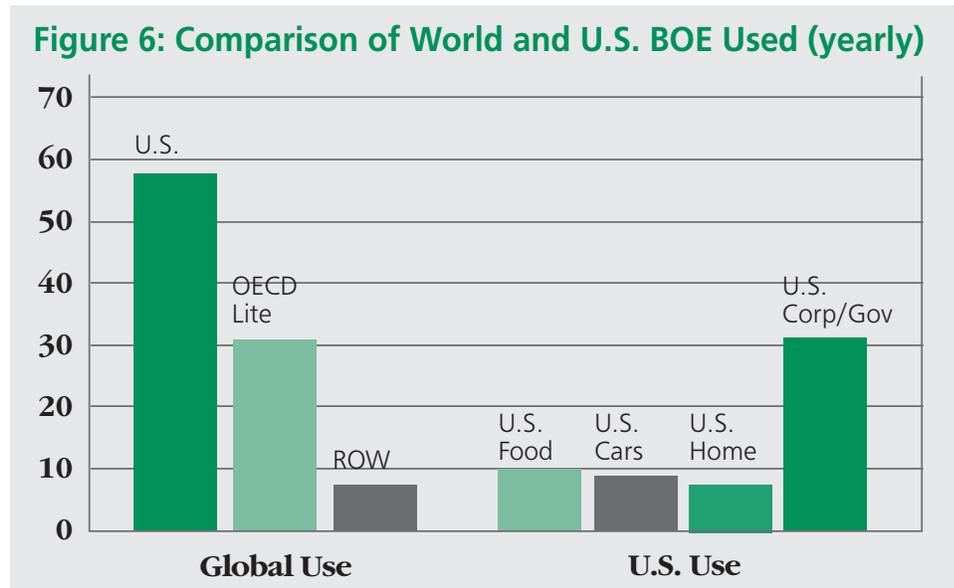
For example, suppose every car owner immediately purchased the most energy efficient car possible, a 50-mpg car. Combine this with a lowering of the speed limit and the car per capita gas consumption would drop from 9 BOE to 3 BOE. A 50-mpg car would be half the size of a large car, causing a reduction in the cost of manufacturing. This would reduce the energy used to mine and smelt iron ore for steel. Driving slower would extend the life of the highways. This would reduce the government energy expenditures for road maintenance. In a similar manner, a move to smaller houses would shrink the construction industry and eating locally grown unprocessed organic

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food would shrink the food manufacturing industry. As noted earlier, personal consumption is the key factor determining the energy consumption of both industry and government.

Reducing consumption may, in fact, be the only way to shrink government politically and reduce the power of corporations. People cannot vote on the products that are made and energy-intensive products mean more corporate revenue and more taxes for government, so there will always be powerful forces that counter any form of conservation or curtailment. One should not expect government and industry to choose cutting back energy use. In other words “Conserving is bad for business and bureaucracies.” However, if we effectively deal with our own personal energy consumption in food, housing and transportation, we can affect government and business. This is the ultimate power of a grassroots movement.

The vast majority of the population is unaware of the magnitude of changes that must be made. Few people are aware of the huge disparity of energy consumption between the U.S. and the third world.



Each category of U.S. energy use represents more than the total energy used by 85 percent of the world's population (ROW).

Nor have they given any consideration to the implications of declining fossil fuels in regards to survival of people in the third world or to the survival of their children.

Long term, the necessary consumption reductions are not in the range of 5-10 percent but in the range of 70-80 percent! In a few generations, total availability of fossil fuels may be much less than 5 BOE per person. How can a U.S. citizen continue to consume 57.5 BOE per person in light of this information? Radical management of fossil fuel resources, for an order of magnitude reduction, is the long term requirement. But since we cannot count on the government and corporations, we must begin by focusing on food, housing and transportation – areas where we have personal control.

Food Efforts

David Pimentel¹⁴ has pointed out that the U.S. expends 10 calories of fossil fuel for every calorie of food energy produced. Other research shows that the U.S. spends 17 percent of its total energy on food.¹⁵ Either calculation arrives at the rough approximation of 10 BOE (barrels of oil equivalent) per person per year. In an organic, local, high-labor form of agriculture, which was practiced for centuries and is still practiced in many parts of the world, one calorie of labor can produce more than one calorie of food. Assuming a minimum of two calories produced for every one calorie of labor expended, a 20 to 1 difference (the product of the 10 to 1 ratio of fossil fuel to calories consumed and the 1 to 2 ratio of high-labor cultivation) between current and future ways of farming illustrates the possibility for rebuilding a truly sustainable way of growing food. There are six steps to reaching this goal.

1. The first step in reducing the fossil fuel energy cost of the food system is to eat less. David Pimentel notes that the average person in the U.S. consumes 2,200 pounds of food in a year.¹⁶ Also, the average U.S. citizen consumes 3,800 calories per day; however, humans only need 2,500 calories (kilocalories) per day, so food consumption could be reduced by one-third.

A side benefit would be better health. Overeating leads to obesity which leads to a variety of other diseases. A good reason for the high cost of American medical care is to treat diseases that are caused by a fossil fuel-rich lifestyle. In a contracting economy, people may no longer be able to afford quality medical care so the maintenance of good health will be vital.

2. The second step is to change one's diet. This means eliminating foods that are very energy-intensive. A good example is the beverage and snack food industry which ranks inordinately high in fossil fuel consumption. Fast foods and pre-packaged, highly processed manufactured foods should be avoided. The manufactured food industry is also associated with high fuel costs for refrigeration since the American lifestyle requires that liquids be chilled and food kept frozen. One might consider the 100 million refrigerators connected to thousands of power plants spewing CO₂ into the atmosphere to keep hundreds of millions of cans of Coke or Budweiser at a constant low temperature.

The role of food corporations is significant. The large food manufacturers (and manufacturers implies fossil fuel intensive products) are the same people who provide extremely dangerous products. The largest food company, Altria (previously Phillip Morris) is also the largest producer of cigarette products. Part of wise purchasing is to determine the corporation behind the brands and examine their actions and motivations.

We must begin to consider the type of food we eat, its source and the distance it must travel.... We must also eat less and reduce meat consumption of industrial animal products.

3. A third important aspect of diet is meat consumption – both the volume eaten and the kind of meat. The consumption of meat per capita in the developed countries is almost three times the consumption in the developing world.¹⁷ The developing world has doubled its per capita meat consumption since 1990, leading to

more fossil fuel consumption. An industrial meat-based diet takes twice as many fossil fuel calories as a plant-based one. However, this does not mean the complete elimination of meat. Meat can be provided without using a high-energy form of food such as is used now in the form of feed corn and soybean meal. Locally grown meats using natural forage is not energy-intensive.^{18, 19, 20, 21}

4. Eating less, changing diets by eliminating processed foods, and reducing industrial meat consumption are the first three steps and can be taken without knowing anything about raising food. Step four is to purchase food differently. This means buying food produced by local producers to the maximum extent possible. Joining a Community Supported Agriculture (CSA) group is important if one is available. There are three results. First, local production is supported and that means less fossil fuel is used to transport the food. Secondly, it is a way to convert the country's agriculture from a corporate-based, high-energy consuming one to a more efficient one. Third, it supports new farmers, in many cases young ones desiring a farming career.

5. The fifth step is to begin preparing your own food for storage. This reduces the energy used in keeping products frozen for months. It also allows more local food production since farm products are not just for the growing season but also for the winter period when food sources are either stored or kept frozen and later moved over large distances. This further cuts the power of the corporation and allows for more local food security. And it allows one to begin to personally participate in the food process. Learning to can is easier than learning to farm.

6. A sixth step is to create a garden or a henhouse. Producing one's own food allows one to actually experience the miracle of food from the land. This is a vital part of raising one's consciousness about food to counter the ignorance that currently colors our world view about nature and its bounty. Americans are not as far from the soil as is popularly assumed. Gardening, even if for flowers and not food, is an enjoyable past time for many people.

We must begin to consider the type of food we eat, its source and the distance it must travel. We must eat differently for our health, particularly with the rise in medical costs. We must also eat less and reduce meat consumption of industrial animal products. We must buy local, eat local, and store local. We should avoid all packaged goods to the extent possible. When possible, we need to develop our back- or front-yard gardens, replacing our fossil fuel intensive “carpet” lawns.

Transportation Efforts

Thinking out of the box is a mantra of our techno-fix society, but getting too far outside the box is not popular. Every innovative proposal relative to the car is acceptable for discussion except to get rid of it. The private car is a core American value (some say addiction) and may be the most destructive invention in the history of the world. A radical approach to the car is needed.

A global thought about cars might be that on a worldwide basis, except for America and Canada, people buy efficient cars and have so for decades. Americans, with 5 percent of the world’s population, have 25 percent of the cars. But Americans use 44 percent of the gasoline.²² Thus private transportation is not so much the issue in America but private transportation with style. U.S. manufacturers make large cars in their native lands but have complete lines of small efficient cars which they market across the globe. Americans think that new technology is needed, such as fuel cells, hybrids, electric vehicles or combinations. This rationalization lets consumers buy wasteful cars while lambasting the auto companies for making them. At the same time, television’s nightly news extols high performance hybrids that get 24 miles per gallon! A single act of Congress could change that overnight, but there is no political will for such an event.

The first step is to change one’s car to an efficient one at the earliest opportunity, whether it is new or used. Hybrid prices and limited availability cannot be used as an excuse – there are many small cars available and more are being introduced every

year. These small cars have been available for a long time, such as the Honda Civic VX, made from 1992 through 1995, which averaged over 40 mpg or the 60-mpg Honda Insight.

Quickly moving to a smaller car is a key step but not the ultimate one. The second step is to share rides as much as possible. The average trip in the U.S. has 1.6 persons, including the driver. Increasing the number of people in a car directly reduces the energy consumed and reduces congestion. By adopting sharing as a value, the huge reduction in energy consumption needed can be achieved. Driving less and more slowly, and bicycling as much as possible are also important.

Housing Efforts

Like everything in America since World War II, the “Big is Better” value system affects housing. In 1950 the average new house size was approximately 1000 square feet. Today it is about 2,300 square feet. At the same time the average family size has gone from about 3.7 to 2.7 people. Thus the average square foot per person has increased from 270 square feet to 815 square feet, a factor of three times. Style changes have increased the average ceiling height and added more windows, further increasing the consumption of energy. Finally a variety of new appliances have been added to the household, increasing fuel consumption in the operating of the home.

Even though improvements in efficiency have occurred in the building structure, heating and cooling systems, as well as in appliances, energy consumption has continued to increase. Houses built during the 1970s and 1980s consumed approximately 79 million Btus per household per year. The average consumption in the 1990s was 91.3 million Btus. For homes built in 2001 and 2002 energy consumption was 111 million Btus, an increase of 40 percent over the 1980s period. This has taken place in spite of such programs as the government Energy Star program.²³

The first energy saving step is to live in a smaller space. Smaller homes, particularly multi-family units, use less energy to main-

tain the same level of heating and cooling. Like food (eat less) and cars (drive smaller cars shorter distances) there is no easy way out of this.

Each person must begin reducing consumption as they see fit, but very few people will be able to simply build a new smaller, more efficient dwelling. Major home manufacturers do not focus on providing such homes which means a custom home might be required. Custom homes are more expensive than regular developments but are still worth while if they can be afforded.

The average home lasts 60 years, thus it will take a very long time to convert the housing stock to more efficient buildings. As noted, more recently constructed homes use more energy to operate than some older buildings. “Green Building” is heavily marketed as an option but has only a miniscule effect on the building industry to date and serves mostly as a distraction to making the big step to renovate and retrofit our homes. The U.S. Green Building Council’s Leadership in Energy and Environmental Design (LEED) program is also heavily publicized but in reality has little effect.²⁴

Even though improvements in efficiency have occurred both in the building structure, heating and cooling systems as well as appliances, energy consumption has continued to increase.

Both “Green Building” and LEED building serve the same function as new technology for cars – they obscure the fact that it is not technology but political will that is lacking. Both programs address a wide variety of possible changes but ignore the basic simplicity of the problem – buildings are poorly insulated. Having grey water options for plumbing outflow may save water for watering the plants but is insignificant when compared to the energy going out large windows. Most so-called “green” residences are limited to very expensive, one-of-a-kind, architect-designed homes.

In 2005 the EPA proposed an addition to the building codes that would require a

minimum wall thickness of 5.5 inches, up from the current 3.5 inch standard. This would have provided better wall insulation. It was defeated by the National Association of Home Builders.²⁵

Popular media stories about “green” homes and LEED buildings for commercial construction abound. But in actuality, the energy savings are very limited. Calling a building green makes people feel good, but does little toward reducing energy consumption or stopping global climate destruction.

So the second step is to retrofit the home you have. The following table shows the percent of energy use for various functions in the typical home.

Table 1: Breakdown of Home Energy Use

Home Space Heating	50.0%
Water Heating	15.3%
Lighting	6.8%
Home Space Cooling.....	6.4%
Refrigeration.....	4.6%
Electronics	2.8%
Washer/Dryer	3.2%
Cooking.....	3.9%
Computers.....	6%
Other.....	3.9%

Heating and cooling the building take 56 percent of the energy. This is the most important and most difficult use of home energy to address because it is a function of the building envelope – the floor, walls, ceiling (or roof) and the openings that penetrate the envelope. If a person plans to live a long time in their current home, then retrofitting the envelope may be necessary. This could include adding insulation to areas of the envelope that can be easily accessed such as the attic.

The next level of retrofit might involve building an additional inner wall in parallel to the exterior walls in order to obtain space for insulation. This is an expensive

undertaking and will require investments costing thousands of dollars per house. Finally, doors and windows must be sealed and sometime replaced. Replacing windows is also relatively expensive, often costing thousands of dollars per house.

Step three, after envelope retrofit, is to evaluate and upgrade (or eliminate) all the appliances and other energy-consuming parts of a home which are not dependent on the building envelope. Water heating takes 15 percent of the home’s energy. An on-demand water heater may be an option. Incandescent lights can be replaced with fluorescents. More efficient refrigerators can reduce the 4.6 percent of energy used by refrigerators. The investment to upgrade the appliances and other energy consuming machines in the home is substantial; like the building envelope, it is measured in thousands of dollars.

Eventually larger homes can also be remodeled into duplexes, providing smaller more efficient housing. Costs for such projects are in the tens of thousands of dollars.

Summary

A basic societal transformation is needed to change from the three principle values of Competing, Hoarding and Consuming to values of Cooperating, Sharing and Conserving. These latter values are easier to implement in small local communities where people know each other and have a history of working together.

To usefully “think globally-act locally” we must conserve here at home and we must cooperate at home and abroad in finding just and equitable solutions to the challenges of Peak Oil, climate change and inequity. By thinking this way, we can make choices that will bring life systems on the planet back into balance so that we can survive.

The first steps are personal ones – changing our way of life to use as little energy as possible, keeping in mind the billions of poor people in the world as well as the welfare of our children and generations to come.

– Pat Murphy

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