Beyond Greenhype

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Real Solutions for Climate Change

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Alexis Zeigler

Ecodem Press
Charlottesville Virginia, 2009

ISBN 0-9665048-3-6
ISBN13 978-0-9665048-3-5

Ecodem Press
Charlottesville VA
conev.org
tradelocal@yahoo.com

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Introduction

This book is divided into two sections. The first section looks at climate change, seeking to find realistic, practical solutions to the problem. The second section seeks to understand the roots of the climate change problem in a broader historical context, and thus to move personal solutions into the political realm.

This book was designed as an e-book, hence it is formated in short paragraphs with key words in bold. An effort has also been made to personalize material that is often abstract and global in scale. Thus many passages are addressed to "you," the reader. The reader should understand personalizing the material is not intended to blame you for social ills, while absolving the writer or anyone else. It is rather intended as an invitation to see your personal role in both the problems we face and the solutions.

Other writings by the author can be found at conev.org. The author can be reached by email at tradelocal@yahoo.com, or by writing to:

Alexis Zeigler
P.O. Box 703
Charlottesville VA 22902

Book One: Climate Change; Assessing the Problem, Finding Real Solutions

Chapter One: Our Addiction to Oil Fossil Fuel

"America Is Addicted to Oil"
George W. Bush[1]

Greenhype

Climate change has finally entered the public consciousness. But in spite of the popular awareness that climate change poses a threat to our future, understanding the importance and timing of the threat can be difficult. How bad is climate change? How soon will it happen? **How much should I worry? What can I do?** This book seeks to answer these questions, from both the personal and political perspective.

The confusion about climate change is exacerbated by the barrage of Greenhype coming from every corner these days. Al Gore hosts an internationally acclaimed concert to elevate public awareness of the threat of climate change, and Chevrolet is one of the primary sponsors. Is that green, or is that hype? There are myriad companies and organizations selling new products, and new ideas. Is it green, or is it hype? Understanding effective responses – sorting the green from the hype – can be done, indeed must be done.

Climate change is a manifestation of the enormously complex global climate system that will never be understood in its entirety. You need not – cannot – wait until every detail about the global climate system is understood to take personal action.

The purpose of this book is not to repeat the simplistic recipes for personal conservation devoid of any quantification of the real impact of such actions, but rather to try to discern what actions we can take, individually and collectively, that will be truly **effective at halting climate change**.

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1 *Bush: 'America Is Addicted to Oil'* By Mike Allen/ Washington, Time Magazine, Tuesday, Jan. 31, 2006

Energy Slaves

For many millennia, humans relied on only their own bodies for power. The average person can sustain only about 1/20th of a horsepower of power output. The car you drove to the corner grocery to get a pack of gum does the work of 2,000 people. [1]

We have grown accustomed – some would say addicted – to using phenomenal amounts of energy without even thinking about it. The amount of energy used by the average American on an ongoing basis is the equivalent of 100 to 150 fit people, working at full exertion, 24 hours a day, 7 days a week. Some writers have used the term "energy slaves" to describe the hidden power input into our daily lives.[2] If one presumes that these "energy slaves" are simply normal people working a normal workweek, then **the number of "energy slaves" at your disposal on a daily basis climbs to 700**.[3] We have become habituated to this extraordinary use of energy. All of the energy we use results in the release of carbon, and that carbon is the primary driving force behind climate change.

Buried Sunshine

The energy that feeds our "energy slaves" is actually a massive store of buried sunshine. Over the course of millions of years, vast deposits of organic matter have been buried underground on the Earth. With time, compression, and heat, that organic matter has been broken down into coal, natural gas and oil. Jeffrey Dukes has estimated that a "**staggering 98 tons of prehistoric, buried plant material – that's 196,000 pounds – is required to produce each gallon of gasoline** we burn in our cars, SUVs, trucks and other vehicles."[4] We have become accustomed to using

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1 Heinberg, Richard, *The Party's Over, Oil, War, and the Fate of Industrial Societies*, New Society Publishers, Gabriola Island BC, 2005, p.30

2 http://www.earthtoys.com/emagazine.php?issue_number=06.08.01&article=slaves, http://fatknowledge.blogspot.com/2006/08/100-energy-slaves-per-american.html, http://mondediplo.com/2006/05/08energyslaves

3 http://www.theoildrum.com/node/3412

4 *Bad Mileage: 98 tons of plants per gallon: Study shows vast amounts of 'buried sunshine' needed to fuel society, Contact:* Lee Siegel leesiegel@ucomm.utah.edu 801-581-8993 University of Utah. Original article:

these vast stores of energy with no acknowledgment of their unique character. The energy we call fossil fuel is also an enormous repository of carbon, which we are now transferring into the atmosphere at a rapid rate. We have developed God-like powers, and we are scarcely aware of it.

We have God-like powers to disrupt the Earth's climate and ecology. Now we must assume responsibility for the power that we have asserted, and use to it to heal the disruptions we have caused.

The answers are not difficult, but they can be buried in confusing debate. You should embrace personal conservation, the small efforts that each of us make to recycle and use less energy. But you must also understand that those efforts are only a beginning, the first stepping stone up the mountain. As you move up that mountain, you are going to have to change not only your consumption habits. You are going to have to look at, and be willing to change, very basic aspects of your relationship to the larger society around you. That's a big project, and no one of us can do it alone. But together we can inform and empower each other to understand where the next stepping stones lie, to take bigger steps together toward a sustainable future.

What if doing your part to stop climate change made your life more comfortable, more fulfilling, healthier, more socially rewarding, filled with love and companionship? What if we don't need any new technologies to stop climate change, but instead only need to apply the technologies we already have? What if we are standing in a window in history, and we have to make a choice?

Dukes, Jeffrey S. *Burning Buried Sunshine: Human Consumption of Ancient Solar Energy,* Department of Biology, University of Utah, 257 South 1400 East, Salt Lake City,UT 84112-0840, U.S.A. dukes@globalecology.stanford.edu

Chapter Two: Climate Change: How Bad, How Soon, How Much Should I Worry?

The Myth

Every culture has a mythology, and every culture believes its own mythology, and believes it to be superior to the belief systems of all other cultures. We are no exception. But now we are coming face to face with the big picture of the global unsustainability of industrial society, and we are loathe to step outside of our own mythology. Even if it should cost us everything.

We have masked the impacts of many ecological limits by simply building taller smokestacks. If a particular area becomes eroded, we ship food across the oceans. If a particular species becomes endangered or extinct, we ignore it or substitute our dependency onto others. We mitigate pollution in certain areas, but we can only build the smokestacks so high.

Our mythology tells us that progress and inventions have saved us from a dark and dismal past, and can deliver us a bright future. We want a techno-fix for our ecological predicament. But given that carbon release is so fundamental to the use of energy in industrial society, that techno-fix is not going to happen. **We cannot build a smokestack taller than the atmosphere itself.** And that is the reason climate change has become such an issue. It is the limit we cannot ignore, the limit our techno-utopian cosmology cannot address, the problem that cannot be fixed with a taller smokestack.

The Larger Context

The problem of sustainability has long plagued our species. We have the power of hindsight as we look at the deserts left behind by prior great civilizations on the once-upon-a-time Fertile Crescent in the Middle East to ruins in Latin America. In fact, **in the last 1,000 years humans have degraded and destroyed more farmland than the sum total of all of the farmland currently being farmed on the face of the Earth**.[1] We can see the mistakes some of our predecessors have made. But we are

1 Meadows, Donella, Jorgen Rogers, Dennis Meadows, *The Limits to Growth, the 30 Year Update*, Chelsea Green, White River Junction, VT, 2004, p.61

hard pressed to understand what makes large civilizations sustainable, and what causes them to collapse. The output of carbon from industrial civilization stems from the basic laws of thermodynamics. Climate change cannot be resolved by new mechanical technologies, but rather by *social* technologies. By understanding our role in society and applying that knowledge, we can consciously create a sustainable future.

What We Seek

All humans share a common desire to be loved and respected. Every human culture creates a set of social norms. These norms tell us that if we act in certain ways that are beneficial to the group as a whole, then we will be loved and respected. But in modern times, that process has gotten bent out of shape by our hyper-productive industrial economy. In order to sell goods, advertisers have convinced us that buying certain products, owning particular things, will cause people to love and respect us. But the symbolism of love from ownership is hollow. Our relationships have been broken down, and now we lead more isolated lives. Part of rebuilding a sustainable society is to rebuild relationships, to realize that all of the love and respect that we need can be found among the people around us. To live a sustainable life, you will need to work with your friends and neighbors to **relocalize and decentralize our economy**. In doing so, we need to rebuild our relationships with each other and the Earth on which we live.

Science has a role in helping us understand the choices we need to make, but my purpose here is not to dig deeply into the complex science of climate modeling. There are other sources for that information. My intent is rather to put the climate change debate into a political, as well as personal, context. Why have we not responded more quickly, more vigorously? Humans as individuals are intelligent, capable of making plans that stretch decades into the future. Why do our political systems seem so much less intelligent? The problem of sustainability has plagued all large scale human civilizations. Why is that, and why has that not changed in our technologically sophisticated age? And, most importantly, what can you do? How can your actions be linked to a global movement to protect the environment and rebuild community, now and in the years to come? These are the questions for which this book seeks answers.

Pollution

Climate change strikes at the very heart of industrial civilization. The term “pollution” is used so loosely that people often get confused about what it means. While it is true that some engines burn cleaner than others in terms of how much visible pollution they generate, the level of carbon output is directly correlated with the amount of energy generated and, as long as the amount of energy consumed is held constant, **carbon output is unaffected by pollution control technology.** For example, about a quarter of urban smog comes from from small engines, lawnmowers, leafblowers and what not. These small engines have no pollution abatement devices, no catalytic converters. But the amount of carbon generated by cars, even those with the most sophisticated pollution control systems, correlates directly with how much fuel they burn regardless of the pollution controls installed on the car.

When fuel is burned, the carbon in the fuel is transferred to the air. Carbon output cannot be mitigated by ordinary pollution control technologies such as catalytic converters (on cars) or scrubbers (on electrical power stations). While there are new technologies that seek to capture and sequester the carbon from coal-fired power plants, the feasibility of these technologies and the energy consumed by their application remain uncertain. It is also all but impossible that such technologies could be successfully applied to automobiles. **The energy that powers all of our industrial processes puts carbon into the atmosphere**, and no new technology is likely to change the basic physics of that problem. (Nuclear power is in part an exception to this rule. Ultimately, nuclear power relies on government subsidies to make it economically viable because of the liabilities involved.)

You can't make energy on the planet Earth without releasing at least some carbon, and the traditional fossil fuels that we use, coal and oil, release a lot of carbon. And that is the reason climate change has been difficult to tackle. There is no simple technological fix, no smokestack tall enough, no pollution control technology that can stop carbon output. Substantially reducing your carbon footprint requires substantial changes in how you live. Can those changes be achieved incrementally? How do you get your political leaders to take notice? What can you do if they don't? The answers are not simple, but there are answers. Real answers require taking a broader view.

Growing Awareness of Climate Change

Decades have passed since the first postulations that carbon and other gases building up in the atmosphere could cause the Earth to warm by blocking increasing levels of heat that normally radiate back out into space. In the intervening decades, climate scientists have continued to collect data and to build climate models, while Exxon and other corporations whose profits stem directly from our heavy fossil fuel use have spent **millions of dollars hiring skeptics and imitation scientists to sow doubt** and confusion about climate change. Meanwhile, if the weather is unusually warm, you will hear people on the street make jokes about global warming, only to promptly forget the subject once the weather returns to normal.

Most people at this point believe that something is changing in global climate systems, but it is hard to know who to believe, how soon the changes might come – in short, how much to worry. The public awareness of climate change has been growing rapidly, especially since the release of Al Gore's *An Inconvenient Truth* in movie and book form. As Gore points out, even though the scientific consensus is solid, the media usually portrays the issue as uncertain and controversial. Exxon's money has been effectively spent.

Vested Interests in the Climate Change Debate

Particular vested interests have been quite effective at making it appear that climate change is a "theory," a controversial issue. One of the earliest organized climate change denial campaigns was the **Oregon Petition**. The petition has been sent out in mass mailings and posted on the web since the late 1990s. It states that "There is no convincing scientific evidence that human release of carbon dioxide, methane, or other greenhouse gases is causing or will, in the foreseeable future, cause catastrophic heating of the Earth's atmosphere..." and that "The proposed limits on greenhouse gases [in the Kyoto Protocol] would harm the environment, hinder the advance of science and technology, and damage the health and welfare of mankind." The petition has gathered thousands of signatures from "scientists," but **the methodology of gathering signatures has been questioned**, as has the veracity of the scientific degrees claimed by some of the signatories.

Limbaugh and Other Extremists

My favorite climate change denier is Rush Limbaugh. From his book *I Told You So,* we have these pearls of ecological wisdom (this is a direct quote):

* "Despite the hysterics of a few pseudo-scientists, there is no reason to believe in global warming."
* "Mankind is not responsible for depleting the ozone layer."
* "The Earth's ecosystem is not fragile, and humans are not capable of destroying it."
* "The real enemies of the radical environmental leadership are capitalism and the American way of life."

As silly as such pronouncements may seem, I wish I could say they were ineffective. But at the time of this writing, a quick search of the phrase "global warming" on amazon.com reveals that the two **top selling books**, by their accounting anyway, are **climate change denial books**.

Exxon has been the most aggressive player in trying to deny and squelch the growing concern over climate change. Recently, they have begun to change their tune, at least to a degree. They now admit that climate change exists, although they are quick to point out that continued fossil fuel use and industrial growth are critical for the alleviation of global poverty. If mandatory curbs on accelerating fossil fuel use were put into place, then presumably that could have an impact on Exxon's profits. That leaves them terribly concerned about the impact of such mandatory curbs on the world's poor.

The Timidity of Mainstream Media in the Climate Change Debate

Even our supposedly objective media sources have contributed to creating a public impression that climate change is a controversial theory. In May, 2006, just as *An Inconvenient Truth* was reaching the public, *All Things Considered*, a popular show on National Public Radio, reviewed the film. [1] *An Inconvenient Truth* points to the melting of glaciers around the world as evidence of global warming. Kilimanjaro

1 *All Things Considered*, May 24, 2006, Richard Harris, NPR science correspondent.

is one site of such melting glaciers. Kilimanjaro is (or was) an ice-capped mountain in Southern Africa, the subject of folklore, myths and music for the people who surround the great mountain. In the May 24 NPR story, Richard Harris, an NPR science correspondent, pointed out that there are other potential explanations for the **loss of ice on the famous mountain**, local changes in rainfall and climate that may not be related to global climate change. Fine. But then you realize that **glaciers all over the world have been receding**. Glaciers on every continent are melting, at dozens of sites all over the world. The melting of the arctic ice cap and the arctic tundra has been severe and rapid. Harris didn't bother to mention that part. If the glaciers of Kilimanjaro are melting, then that is not compelling evidence of a global shift in climate. If the arctic tundra and glaciers on every continent are melting, that is far more compelling. One wonders what is to be gained by such false representations of the critics, a nit-picking of evidence that misrepresents the whole.

Growing Public Awareness

In spite of such shenanigans, the public is becoming more aware, and that awareness is becoming more sophisticated. Global warming is often referred to as climate change, because although the average global temperature is expected to rise, **a diversity of changes in weather patterns are likely.** Climate change will lead to more powerful hurricanes, increased evaporation that will cause droughts, and also increased flooding. Some areas of the globe might even grow cooler.

Most writers approach climate change with a rendition of possible outcomes and disasters, but try to present such dismal possibilities as a disaster that we can avoid if we only change our buying habits and start using more energy efficient technologies. In our industrial age, we have come to expect decisive answers at our fingertips. But the global climate is a huge, complex system. No one can predict the long term behavior of the global climate with intimate accuracy, no matter how sophisticated the models. Such uncertainty, combined with the bizarre and crassly cynical behavior of particular vested interests could have resulted in our debating the issue for centuries to come. For better or worse, the factor that has trumped such debate is nature herself.

Katrina

To read abstract theories about increased storm activity, about the potential for larger hurricanes, more flooding and extreme weather has a limited impact. But when Hurricane Katrina came ashore in August 2005, the real human suffering put a face on those theories. No one can point to any particular weather event and say it happened because of global climate change, but the connections are clear nonetheless. Climate change is causing sea surface temperatures to rise, and **the power of hurricanes is directly correlated with the temperature of the water** over which they form and travel.

The faces of the stranded victims, struggling to survive, the pictures of the dead bodies floating in flooded streets, brought home to America a message that climate scientists could not hope to communicate through intellectual lectures.

Katrina also brought home a few other messages. Those included the extent to which the federal government was out of touch with the struggles of ordinary American people. A decisive response to Katrina was formed only after it became clear that the outrage and sadness of the American public was a clear political liability. Katrina also shattered an American sense of invulnerability, that we would not be subject to the kind of natural disasters that are endured by less developed nations.

Climate Change is Killing People Around the World Already

Apart from Katrina, American citizens have been largely cushioned from the impacts of climate change. Not so in other parts of the world. The World Health Organization released a report in 2005 that **tied climate change to 150,000 deaths annually** on a global scale, and climate related deaths are expected to double in 25 years.[1] These deaths are caused by increased frequency of heat waves and droughts, as well as floods and more powerful storms linked to climate change. Climate change has increased deaths in urban areas as heat waves exacerbate the

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1 *Climate Shift Tied To 150,000 Fatalities, Most Victims Are Poor, Study Says,* Juliet Eilperin, Washington Post Staff Writer, Thursday, November 17, 2005; Page A20, also reported in the journal Nature, Volume 438 Number 7066 pp257-394

impacts of smog and related respiratory problems, as well as creating more variable precipitation patterns. These are the impacts **already** being experienced, and climate change is only beginning to make itself felt.

There are many risks from climate change. Some areas of the world could become much drier, both as a result of increased evaporation because of rising temperatures, and because of changes in rainfall patterns. Lester Brown estimates that the **amount of land on the Earth suffering from drought conditions has doubled since 1970**.[1] This has occurred even as global rainfall in total has increased by an estimated 10%.[2]

Ironically, even though it is the industrialized West that has generated most of the increase in atmospheric carbon, the areas that may suffer the most are in the less developed nations. The **arid areas of Africa have already seen decreases in rainfal**l and increasing drought, and may see yet further increases in the frequency and severity of drought. All over the world, deserts have been growing because of increasing temperatures and the excessive removal of vegetation by humans and our domestic cattle, sheep and goats. **Dry areas in the American West, Northern China, Australia, and Africa will likely become drier still.**[3] The southeastern U.S. may become a grassland because of increased heat and drought.[4]

Impacts of Climate Change

Paradoxically, climate change could mean both greater and more frequent droughts, but it also will likely mean greater and more frequent flooding. Oceans cover nearly three-quarters of the Earth's surface, and as the oceans warm, evaporation increases. Average global rainfall will

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1 Brown, Lester, *Plan B 2.0; Rescuing a Planet Under Stress and a Civilization in Trouble,* Norton, NY NY, 2006, p.63

2 Pearce, Fred, *With Speed and Violence: Why Scientists Fear Tipping Points in Climate Change,* Beacon Press, Boston, 2007, p.20

3 Spence, Chris, *Global Warming: Personal Solutions for a Healthy Planet*, Palgrave, Macmillan, NY NY, 2005, p.35, Linden, Eugene, *The Winds of Change: Climate, Weather, and the Destruction of Civilizations*, Simon and Schuster, 2006, p.254-257

4 Speth, James Gustave, *Red Sky at Morning: America and the Crisis of the Global Environment,* Yale University Press, New Haven, 2004, p.17

increase, but much of this increase will be seen – is already being seen – in **larger and more powerful storms.** The strength of Pacific typhoons striking Asia has increased, as well as that of Atlantic hurricanes. Insurance costs are skyrocketing in coastal areas.

Another risk of climate change is the **spread of disease.** Many disease carrying insects and rodents thrive in warmer temperatures. Climate change is likely to provide significant opportunities for mosquitoes, tsetse flies, rats and other disease carriers to expand their territory, either by moving to higher elevations in mountainous areas or by expanding their territory to more northern altitudes.[1]

Oceanic Impacts

The ocean is being acidified by human activity. The increase in carbon in the atmosphere is causing a build-up of carbonic acid in the world's oceans. At first it was thought that increased carbon would accelerate the growth of plant life, including oceanic phytoplankton. These latter tiny and multitudinous plants are the bottom of the food chain of the oceans. They also generate oxygen in the atmosphere, and absorb carbon. Increases in carbon do increase plant life to a point, but in many terrestrial and aquatic ecosystems, we are beyond that point already and excessive carbon is causing plants to grow less, not more.

The oceans hold 50 times as much carbon as the atmosphere.[2] Over the eons, carbon has shifted from air to water to land. If the rapid increases in carbon caused by industrialism **cause the oceans to decrease their carbon uptake**, then that could have significant impacts on the amount of carbon that remains in the atmosphere. The disruption of the food-chain in various parts of the worlds' oceans would also have enormous impacts on the availability of fish that humans now consume.

The Intergovernmental Panel on Climate Change (IPCC) is the U.N. body organized to study climate change. This much maligned organization, now the recipient of a Nobel Peace Prize, is a consensus group. Coal and oil exporting countries have the right to seat scientists of their choosing on the IPCC. That means **the IPCC has to satisfy coal**

1 Gore, Al, *An Inconvenient Truth: The Planetary Emergency of Global Warming and What We Can Do About It*, Rodale, Emmaus PA, 2006
2 Pearce, Fred, p.86

and oil producers with their final reports. The result is that they are predicting a slow, linear, incremental warming of the Earth's climate over the next century. Many scientists now disagree with that assessment.

Danger – Runaway Warming!

The deepest danger of climate change is that once warming reaches a certain level, it could put in place a set of **positive feedback loops that cause a runaway warming** effect that is anything but linear. (A positive feedback loop is a self-amplifying loop, like when you put a microphone too near a speaker, and a noise signal loops and amplifies itself, creating an ear-splitting screech.)

We now have a fairly detailed understanding of the Earth's climate for over 600,000 years. In the past, **the climate has not changed in a slow, linear, incremental fashion** as suggested by the IPCC. If a certain amount of pressure to change is put in place, rather **sudden shifts in temperature or ocean currents** result. Ocean currents, such as the Gulf Stream, distribute heat and moisture around the world. According to new research, ocean currents have historically changed course in a matter of a few years, or even a few months. If such sudden changes occur in modern times, that would have a dramatic impact on life on Earth.

The Thawing Tundra

Other potential positive feedback loops impacting global temperatures are occurring in the arctic tundra. In the polar regions, there are vast areas of tundra that have remained frozen year round for tens of thousands of years. These frosty bogs contain **vast stores of frozen organic matter**. These areas are starting to thaw. The organic matter stored there is decaying at an accelerated rate, releasing both stored carbon and methane.

Methane is the primary component of natural gas, and is also far more potent than carbon dioxide as a greenhouse gas. Most writers quote the figure that methane is 20 times more potent than carbon dioxide. That is based on the standard of the Kyoto Protocol that measures warming over a century. But measured over shorter time spans, the difference becomes even more extreme. Measured over a single decade, **methane is about**

100 times more potent as a greenhouse gas than carbon dioxide.[1] Although the primary cause of climate change is carbon buildup in the atmosphere, **levels of atmospheric** methane are climbing as well. Methane is generated by anaerobic decomposition of organic matter that occurs when plants decay under water.

Global Warming is More Extreme at the Poles

Climate change does not occur evenly at all latitudes. Rather, the poles warm more rapidly than does the equator. A five degree Fahrenheit warming for the whole world means only one degree at the equator, but 12 degrees at the poles.[2] Global temperatures have already risen about .8 degrees Celsius, or 1.4 degree Fahrenheit.[3] **The vast arctic tundra is already melting.** It is likely to be an enormous source of new carbon and methane that will be released into the atmosphere. The potential exists for a powerful positive feedback loop whereby warming in the arctic regions leads to massive releases of methane and carbon that then cause more warming in the arctic regions, leading to further releases of potent greenhouse gases.

Sea Level Rise

Al Gore in *An Inconvenient Truth* points out the possibility of the meltdown of the west Antarctic Ice sheet or the Greenland Ice sheet, either of which would raise sea level by 20 feet. Consider that in the context of the low-lying areas already inhabited by humans. In Bangladesh alone, there are 15 million people living within one meter of sea level, another eight million in a similar circumstance in India.[4] If sea levels rise, land inhabited by hundreds of millions of people could be submerged.

Tipping Points

The public has become aware that the climate is changing incrementally. Meanwhile the scientific community is becoming increasingly alarmed

1 Pearce, Fred, p.78
2 Gore, ibid, p.148
3 Brown, Lester, ibid, p.60-61
4 Brown, Paul, and Leipold, Gerd *Global Warning: The Last Chance for Change,* Reader's Digest, Pleasantville NY, 2007, p.15

that **the climate may be nearing a tipping point** when much more dramatic changes might occur. What happens if we reach a tipping point? What if the positive feedback loops prove to be unstoppable beyond a certain level of warming? Some writers have raised the specter of Venus, a planet where the atmosphere is composed mostly of carbon dioxide, and as a result the surface temperatures are higher than the melting point of lead. Not a pretty picture for living creatures. While it makes a dramatic point, the worst case scenario for planet Earth, as far as climate scientists can tell, is not Venus, but rather the primordial Earth itself.

If the positive feedback loops get out of control, we will be looking at an Earth that NASA's James Hansen has referred to as "unrecognizable." If all of the ice on the Earth melts, that would lead to an astonishing **sea level rise of 230 to 260 feet.**[1] A rise of that magnitude would happen over centuries, but it might be unstoppable if we pass a tipping point in the Earth's climate system.

Most of the human species lives near coastlines. Even a small rise in sea levels would have enormous impacts. A much larger sea-level rise would have extraordinary consequences. Most of the land currently inhabited by humans would be flooded. The Earth would look like the steamy, primordial world of millions of years ago when dinosaurs ruled the Earth. Human numbers would likely be drastically reduced. Many, if not most, of currently existing species would go extinct.

Have We Passed a Tipping Point Already?

The melting of the arctic regions is occurring faster than any of the models predicted. The ice at the north pole, according to measurements taken by the U.S. navy, has thinned by 40% in the last 50 years.[2] Predictions regarding if and when the arctic ice cap might melt completely are being revised each year as the process accelerates faster than anyone predicted. In the summer of 2007, the arctic ice cap retreated more than any of the climate models predicted, opening up the mythical

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1 Pearce, Fred p.40, Brown, Lester, p.59

2 Gore, Al, *An Inconvenient Truth: The Planetary Emergency of Global Warming and What We Can Do About It*, Rodale, Emmaus PA, 2006. p.143, Brown, Paul, and Leipold, Gerd *Global Warning: The Last Chance for Change,* Reader's Digest, Pleasantville NY, 2007, p.128

"northwest passage" for the first time in recorded history.[1] In the summer of 2008, the ice retreated nearly as far as the year before. Some predictions now indicate that **the polar ice cap could melt entirely in less than a decade!**[2]

The fact is that **the arctic is melting faster than anyone predicted.** White ice reflects sunlight and heat. Scientists refer to this as the albedo effect. As the arctic ice melts and is replaced by dark water, more light and heat is absorbed, creating more potential for an unstoppable positive feedback loop. The Siberian tundra, once a frozen landscape, is turning into a sea of bogs and lakes even as you read these words.[3] Again, this is happening faster than any of the current models had predicted.

The Annual Rate of Atmospheric Carbon Accumulation is Accelerating

We seem to be constantly surprised – not a good omen for the future. While governments – the U.S. in particular – have dragged their feet in negotiating reductions in carbon emissions, the level of carbon is rising in the atmosphere each year. Most alarmingly, in the last ten years, **the rate of increase has increased.** The average rate of carbon increase in the atmosphere from 1960 to 1995 was 1.4 ppm (parts per million) per year. But the increase from 1995 to 2005 was 1.9 ppm per year.[4] We are headed rather decisively in the wrong direction.

Remember This – 350 PPM

James Hansen is the most prominent climate change scientist in America, so much so that the administration of President George W. Bush took measures to try to muzzle him.[5] Hansen dropped a quiet bomb on the

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1 *Arctic Melt Opens Northwest Passage,* John Roach, National Geographic News, September 17, 2007, *Warming Opens Northwest Passage*, BBC News, Friday, 14 September 2007

2 *Can We Save the Planet and Rescue the Economy at the Same Time?* Al Gore, Mother Jones Magazine, November/December 2008 Issue

3 Pearce, Fred, p.78

4 *Carbon dioxide rate is at highest level for 650,000 years*, By Steve Connor, Science Editor, Saturday, 3 February 2007, The Independent, UK

5 Bowen, Mark, *Censoring Science: Inside the Political Attack on Dr. James Hansen and the Truth of Global Warming,* Dutton, 2008

world of climate change science in December 2007 when he made a public statement (and later released a joint-authored paper) claiming that **climactic stability can only be maintained below 350 ppm** carbon concentration in the atmosphere.[1] We are already at 385 ppm. Hansen's conclusions are based on an interpretation of Earth's history. According to Hansen, the last time carbon concentrations in the atmosphere were this high, the oceans were dozens of meters higher than they are now. Hansen is quick to point out that carbon levels can be reduced, but only if we take decisive action. He advocates a **moratorium on the construction of coal fired power plants** and the implementation of carbon sequestration as soon as possible.

Russian Roulette?

The critics are correct in suggesting that the science of climate change is very complex. It is clear that global temperatures are warming. But the feedbacks between air currents, ocean currents, ice sheets, tropical and polar weather patterns are so complex that we will never understand the full intricacy of all the relationships that govern our global climate. Scientists are hotly debating and diligently working to try to understand which piece of the climate system is the "trigger" or the "tipping point" that can cause the other systems to change. Does the ocean conveyor, the gulf stream and other currents that circulate around the world, dictate the movement of air currents and local climate? Or do the tropical oceans with enormous stored heat serve as the driver of global climate? No one knows for sure. Such **uncertainty is not a call to inaction** as the climate critics would suggest. Rather, it indicates that the whole situation is one in which we are conducting an "unknown experiment" with the entire climatic system of the planet Earth.[2] A more common term for that is Russian Roulette.

Most writers tend to write what they think their readers want, or at least

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1 A report of the speech is at *Remember This: 350 Parts Per Million*, By Bill McKibben, Washington Post, Friday, December 28, 2007; Page A21. The paper outlining Hansen et al's position is *Target Atmospheric CO2: Where Should Humanity Aim?***,** James Hansen, Makiko Sato, Pushker Kharecha, David Beerling, Valerie Masson-Delmotte, Mark Pagani, Maureen Raymo, Dana Royer, James C. Zachos available at http://www.columbia.edu/~jeh1/2008/TargetCO2_20080317.pdf

2 Speth, James Gustave, p.17-20

are willing, to read and listen to. In this regard, discussions about climate change tend to issue a series of potential problems, large and small, that we might have as a result of climate change, and then to say "it's not too late if only YOU take small, individual actions....."

The number of writers who will deny the Earth is warming, at least in the last few years anyway, has shrunk to a very few. The future warming of the Earth is hard to deny given the current melting of polar regions and mountain glaciers. There are the dedicated few who still hold the position that it's not a big problem, that humans and nature will adapt, that the warming will come slowly and not go too far, that the need for economic development remains more important than addressing such far-off issues. At the other end of the spectrum are those, most scientists among them, who point out very dire potential consequences from climate change. The list of potential problems that can be caused by climate change is already so overwhelming that I think most writers stay away from the real gloom and doom scenarios.

Avoiding "Extremism" or Avoiding Truth?

The climate scientists are the first to admit that their models are ultimately educated guesses. And after the super-computers run their complicated and ultimately fallible computations, one can hear in the distinct note of **unease among the climate scientists,** sometimes bordering on quiet panic. It comes through in statements about the range of possibilities, about historical data that indicates that very **sudden shifts have occurred in Earth's climate** in times past, about tipping points and uncertainties. They are, understandably, cautious about making the most dire of predictions. The most significant impact of the climate change nay-sayers has been to cause climate scientists to mute statements of the more dire of possible outcomes.[1] Thus any talk of a runaway change of climate is rarely discussed, because most writers are fearful of overwhelming already fearful readers, and because the climate scientists do not want to be seen as extremists. Politics and politeness aside, **a runaway change in climate is possible.**

Up until recently, there was a din of right-wing talk show hosts saying that climate change was not happening. As public awareness of climate change has grown, the prepaid right-wing skeptics have silently slipped

1 Pearce, Fred, p.17

off the stage. Some prominent groups, such as the American Enterprise Institute, are still publishing voluminous data and reports to suggest that maybe climate change is really happening, but it will not be so bad after all. The polar bears have survived difficult times in the past, they say. If the polar ice caps melt, then they will adapt, the plants will grow faster, and there's nothing to worry about.

The Earth is already warming measurably, which has fairly effectively trumped the nay-sayers who said it wasn't going to warm at all. It may warm slowly, humans may respond effectively, slowing and eventually arresting the trend. Or the entire process may spin out of control and cause Earth to enter a super-heated state such as existed in primordial ages when the seas were hundreds of feet higher than they are now and big lizards dominated the world.

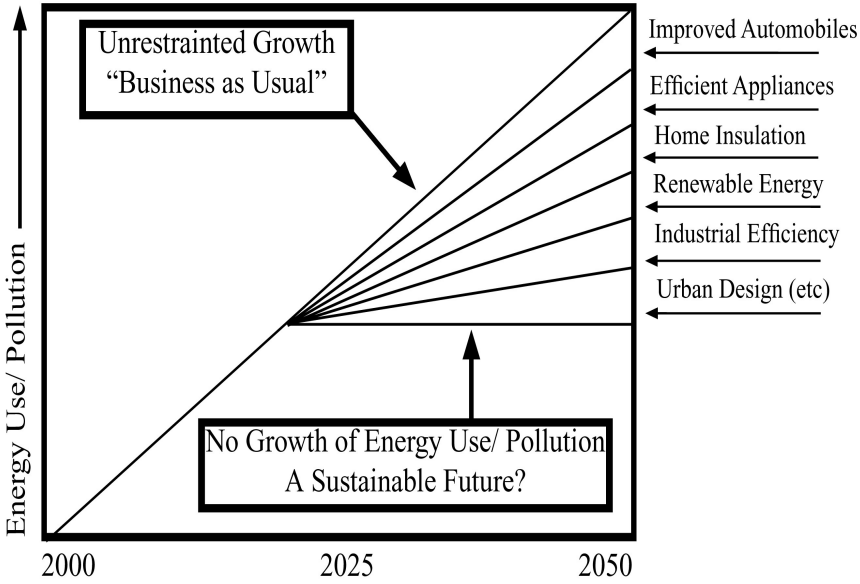
Now it's time for a "reality check." Are we really having a debate about whether or not to roast the planet? Granted the uncertainties are huge, but why are we playing Russian Roulette like mad Gods? Are we that stupid, that greedy, or is there something else going on here? Why are we acting this way? And more importantly, how can we effectively address the problem?

Chapter Three: Conservation Technologies: Savior or Distraction?

The Ecological Price of Economic Growth

The modern industrial **economy is predicted to keep growing**, both because population is growing, and because the average amount of resources used by each person is also growing. In the past 100 years, population has grown four times larger, but **the economy has grown a staggering 20 fold** in the same time period.[1] This geometric growth is the root of the modern environmental crisis.

If one were to graph the growth of population and energy use, the line would look like an upward sloping curve. One can also plot a proposed solution in the form of a stacking set of conservation wedges.



The upward slope of predicted growth is reduced by the first wedge, conservation with increased transportation efficiency. Then another wedge is added with better home appliances. Then another with more efficient home heating and cooling equipment, and better insulation.

1 Speth, James Gustave, *Red Sky at Morning: America and the Crisis of the Global Environemnt,* Yale University Press, New Haven, 2004, p.14

Then another wedge is added with more efficient industrial motors, equipment, and production processes. Each wedge is relatively small, but the wedges stack on top of each other. Added together, the stack of wedges reverses the growth of energy use and pollution, and ultimately creates a **stable state or even a slight decline of energy use and pollution**. Presumably high consumption patterns would be left more or less intact, or even increase. That is the optimistic view of how conservation wedges could work.

Efficient Lighting

One of the most popular wedges being pursued these days is compact fluorescent light bulbs, or CFLs. The standard incandescent light bulb with which we are all accustomed is actually more accurately described as a small heater. For every 100 watts used by an incandescent light bulb, 95 of those watts become heat, and the other five watts become light. **CFLs use about quarter as much electricity** as standard incandescent bulbs, and last much longer. At first, the CFLs were large, unreliable and expensive. But now they are made in sizes and shapes very similar to incandescent bulbs, durability has improved, and the price has declined as well. The primary appeal of CFLs to environmentalists is that they are so easy to install. Simply screw out the old bulb and screw in the new, and "Save the Earth." About 20% of the electricity used in the U.S. is expended to make light, so the widespread adoption of CFLs could have a substantial impact on our electricity usage. Australia has become the first nation to ban incandescent bulbs. By 2010, only CFLs and other energy conserving light bulbs will be allowed in Australia. Now legislation has been passed in the U.S. congress to phase out incandescents as well.

Light Emitting Diodes are even more efficient than CFLs and last even longer. LEDs are more expensive, and the first models on the market did not emit as much light as the bulbs to which we are accustomed. But newer models are brighter and are becoming more common.

The Big Players, Cars and Houses

Larger conservation wedges appear as we approach larger sectors of the American economy, the two largest of which are cars and houses. These

are the items on which we spend most of our money, often going far into debt to do so. These are **the sectors that keep our economy growing.** (This issue is discussed in more detail in my prior book, *Culture Change: Civil Liberty, Peak Oil, and the End of Empire.)*[1] The car-housing booms of the 1920s, 1950s, and in more modern times have been the backbone of economic growth. Our 21st century car-housing boom was created by the Federal Reserve who pumped enormous amounts of money into the economy at low interest rates to compensate for the bursting of the "dot-com bubble." (All financed with foreign money, but that's another story.)

Auto-housing driven growth has also been the **driving force behind the ecological decline** of our age. Any reduction in our ecological impact is going to have to, first and foremost, address our housing and transportation choices, as well as how our cities, towns, and lifestyles are influenced by our housing and automobiles.

For every four barrels of oil pumped out of the ground on the Earth, the 300 million people of the United States use one of those barrels of oil, and the 5,700 million of the rest of the world divide the other three barrels among themselves. Oil is used primarily as transportation fuel – the gasoline, diesel and jet fuel that expeditiously propels those who can afford it to all corners of the Earth. Statistics would be hard to generate about the matter, but the global upper class – of which you are a part – uses almost all of the fossil fuel energy available to humankind, and the global lower class uses very little.

More Efficient Cars?

The Model T produced by Ford in the 1920s got between 25 and 35 miles to the gallon of gas. Since that time, average **fuel efficiency has not increased** in spite of extraordinary advances in technology. (Which brings up the question of why we don't use the technologies we already have.) Modern hybrid cars, such as those made by Toyota and Honda, get considerably better gas mileage than the average American car. There are future hybrids already in the works that get considerably better mileage. Amory Lovins of the Rocky Mountain Institute has created on-paper designs of “hyper-cars” that, in theory at least, get hundreds of

1 Zeigler, Alexis, *Culture Change: Civil Liberty, Peak Oil, and the End of Empire,* Ecodem Press, Charlottesville, 2007, see conev.org

miles per gallon. Lovins has been making bold predictions that the hyper-car will overtake conventional cars in the coming decade. The commercial fate of such machines remains to be seen.

The **"plug-in hybrid"** has become the darling of the modern environmental movement. The idea is that renewable electrical energy, such as wind power on an enormous scale, could generate electricity that is used to charge the car's batteries while it is plugged in at home. Then when the driver goes on a short trip, they would use only electricity. When they take a longer trip, the small gasoline (or diesel) engine in the car would get used for greater power and range. Plug-in hybrids appear to have enough momentum, and to be close enough to technology already in use, that they are likely to become prominent in the market soon.

Electric Cars

Electric cars have also made a brief comeback, only to be recalled and scrapped. Such is the subject of a documentary, *Who Killed the Electric Car,* that claims that General Motors sabotaged their own electric car, the EV1, out of fear that it would challenge the dominance and sales of their other cars. Other hostile interests are claimed to have aided the sabotage of the new technology. Oddly enough, when cars were first popularized **back in the 1890s, battery cars outsold gasoline cars** for a number of years. In those times, unreliable gasoline engines were started with a hand-crank, and it wasn't easy. Battery cars were more reliable, and consumer expectations about how far a car should travel were very different than they are now.[1]

The energy use of Americans and other wealthy westerners is so high that any change of our habits could have enormous impacts on the global use of energy. Increases in fuel efficiency of cars in the U.S., Canada, and Australia would greatly reduce global oil consumption. Europe and Japan are already well in the lead in this regard, but they too are looking at ways to conserve further.

1 Fink, James J, *The Car Culture*, MIT Press, Cambridge, 1975, p.16

The Private Estate

Housing in America is another dominant sector in our economy. We expend an enormous amount of money and energy in the construction, decoration, and maintenance of American houses. Americans love their houses. They love to decorate them, to plant flowers around them and mow the grass until it is a perfect green carpet. Americans love to buy and sell houses, and make a lot of money doing so. Particularly when the housing market booms, as it did in recent years, enormous sums of money are traded in the market of buying and selling houses.

People also **borrow money against their houses, and this line of capital is nearly double the value of all stocks and mutual funds traded in the U.S.**[1] Now that the housing market has turned downward, we can appreciate the economic impact it has! Making, buying, selling, decorating, and ultimately living in American houses is big business, and big energy. Every plan for economic recovery assumes we have to revive the good old days when housing drove growth forward. Recession or not, **our housing decisions have big economic and ecological impacts.**

Moving Away from Efficiency?

Sadly, however, the average consumer is unlikely to give much consideration to the energy use of a house, especially in times past. The lack of past concern for energy conservation in housing has left enormous room for improvements in efficiency. Our future is going to involve both escalating energy prices, and escalating concern for environmental protection. **Insulating our homes better will be a necessity.**

American homes are filled with appliances. When people purchase appliances, traditionally they would purchase the appliances that suited them, with the right price, size, color, or function. Rarely did they consider the energy use. The result of this lack of concern for energy use in the marketplace is that **the average refrigerator in the 1940s was more energy efficient than the average refrigerator in the 1970s.**[2] And refrigerators are the single largest user of energy among home appliances.

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1 June Kim, *Housing Bubble – or Bunk?*, BusinessWeek online, June 22, 2005
2 *Alternative Energy Sourcebook*, Real Goods, 1990, p.189

Growing concern over the possible peaking of global oil supplies has led many to be concerned over the amount of fossil fuel energy used to grow and process our food. Currently, **every calorie of food on your dinner plate required 10 calories of fossil fuel to create.**[1] That's a statistic that has been thrown around quite a bit in environmental circles. It is a bit sobering, however, to realize the enormity of energy use in American homes. Taken as a whole, **American kitchens use more energy than our farms**, our **refrigerators use more energy than our farm tractors.**[2] Energy conservation in the American home is not a trivial matter!

Moving Toward Efficiency

There is room for improvement with other appliances as well. The Europeans and Japanese are hard at work in developing more efficient refrigerators, as well as more efficient washing machines. Even a low-quality **front-loading washer uses about half as much energy** as the top-loaders popular in the U.S. Some more expensive European washers use only a quarter as much water and energy as some American models.

Your water heater uses a lot of energy and generates a lot of pollution. Without thinking about it, you generate enormous amounts of carbon dioxide just to take a warm shower. Here again, the Europeans are far ahead of the U.S. in terms of efficiency. Tankless water heaters that heat water on demand are the norm in Europe. When the hot water tap is turned on, the water heater turns on and heats the water en route to the tap. When the hot water tap is closed, the water heater turns off. In the U.S., water heaters with large tanks that stay warm all the time are the norm, and these water heaters have a high "standby loss," meaning they lose heat all day every day when not in use. **Tankless water heaters have zero standby loss**, and are thus **much more efficient** in the average residential application. Tankless water heaters used to be hard to find and expensive. Now there are more brands on the market, and they are more affordable.

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1 Pfeiffer, Dale Allen, *Eating Fossil Fuels: Oil, Food and the Coming Crisis in Agriculture,* New Society Publishers, 2006

2 Brown, Lester, *Plan B 2.0: Rescuing a Planet Under Stress and a Civilization in Trouble,* Norton, NY NY, 2006, p.28

Even better than on-demand water heating is solar water heating, or at least pre-heating. Such is the norm in many parts of the world. **Solar water heating is economically profitable under current conditions**, and widely used in some of the sunnier parts of the U.S. Even in more northern regions, high-efficiency solar water collecting panels can create enough heat to cut domestic water heating bills by 70% or more.

Eating Locally

How else can you save energy and reduce your carbon output? Although it was taboo to say so only a few years ago, now environmental writers often mention food as a critical area. **Eating locally grown food**, and **eating lower on the food chain** are important means of reducing our ecological impact.

Estimates of how far **food travels** before it reaches the American dinner plate vary **from 1,200 miles to over 3,000 miles.** One thing is certain, the age of globalization has greatly increased the distance food travels before we eat it. The average American dinner has food ingredients from five other countries.[1] In the last 40 years, the global food trade has grown nearly four-fold, much faster than population itself.[2] We are importing and exporting prodigious quantities of food. We often import considerable volumes of the same food commodities that we export! Particularly in the United States, we are blessed with wide expanses of fertile land to feed us. The mono-cropping and worldwide transport of industrial-agricultural products is bad for the soil, adds to climate change, and disconnects us from the Earth on which we live. **Buying and growing local food** is an important part of reducing your impact on climate change.

Eat Lower on the Food Chain

The amount of energy invested per unit of output in American agriculture has steadily climbed in recent decades. The primary fossil fuel input in producing grain in the U.S. is not diesel fuel to run the tractors, it is energy (largely natural gas) to produce chemical fertilizers.

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1 Pfeiffer, Dale Allen, *Eating Fossil Fuels: Oil, Food and the Coming Crisis in Agriculture,* New Society Publishers, 2006, p.24
2 Pfeiffer, ibid, p.25

The growth of population and consumption are compounding the environmental impacts of our dietary choices. Every year, we add about 75 million people to the global population (though the rate of growth is slowing slightly). The **growth of consumption of meat and animal products is twice as fast as population itself.**[1] The United Nations Food and Agriculture Organization has calculated that modern **animal agriculture contributes more to climate change than does fossil fuel emissions from the entire transportation sector.**[2] The combination of methane emissions from herbivorous animals, deforestation to make room for animal agriculture, and nitrous oxide emissions from fertilizer make this true. The food choices we make are not a trivial issue.

Given that the fossil fuel used to produce grain has been growing, the fossil fuel energy embedded in animal based foods has climbed geometrically. Living more lightly on a healthy Earth is going to require that Americans and other wealthy peoples eat less meat and animal products. The three leading causes of death in the U.S. – heart disease, cancer, and stroke – are directly correlated with eating too much meat and animal products.[3] Not only can you reduce your ecological impact by reducing meat consumption, you can improve your health as well. Eating no animal products at all is also a healthy and viable option.

Replace Income Taxes with Resource Taxes

Neither you nor I can make policy choices on behalf of our government, or the governments of other nations. But it is important that we stay informed about which policies are helpful so that we can contact elected officials to encourage them to make the right choices. Green taxes are one "technology" that holds the promise to unite and coordinate many conservation wedges. **Environmentally beneficial tax policies are already widely used in Europe**. The general idea of green taxes is that you tax what you want to discourage (the use of virgin resources) and remove taxes (or offer incentives) for activities you want to encourage, such as alternative energy.[4] Carbon trading, whereby companies buy and

1 Brown, Lester, ibid, p.176
2 *Livestock's Long Shadow, Environmental Issues and Options,* UN FAO, released November 2006
3 Robbins, John, *Diet For a New America*, Stillpoint, Walpole N.H., 1987, p.206
4 Durning, Alan Thein, Bauman , Yoram, *Tax Shift, How to Help the Economy, Improve the Environment, and Get the Tax Man off Our Backs,* 1998, ISBN:

sell the rights to pollute in limited amounts, is one form of green taxes.

Without special consideration, green taxes can be regressive, meaning they could adversely impact poorer people. Measures have to be put in place to insure that this does not happen. This can be done by **eliminating regressive taxes** – such as sales taxes or income taxes on lower income or middle class persons – **while increasing taxes on virgin resources**. One can thus create market pressure to encourage people and businesses to conserve, develop recycling, re-use materials, and develop sustainable energy supplies.

Learning from Our Own Successes

There has already been some measurable success in making our society more efficient. The oil price shocks of the 1970s created a substantial unplanned incentive program to encourage the development of more efficient use of energy. As a result, the **energy use per unit of Gross Domestic Product since that time has improved considerably**. That's the good news. The bad news is that even though our houses are more efficient, the residential space per capita has grown so much that our **overall energy use has grown inexorably**, as has the generation of pollution. The same is true across the board. Each appliance is a little more efficient, but we run more appliances than ever before. Some cars are more efficient, but overall gas mileage in the U.S. has stalled while we travel more than ever.

The more fundamental issue is the consumer society itself. So often environmentalists focus on efficiency, but if an industry is making useless widgets by the billion and selling them to people who really don't benefit from them, what does it gain us to focus on making useless widgets more efficiently? Given that the most basic needs of food, water, and shelter, for most people are are easily satisfied, **how much of the modern economy falls into the "useless widget" category?** How much consumerism could you simply do without? But if we reduce how much we buy, we reduce wealth and jobs. The consumer society has become a treadmill of unsustainable prosperity from which we are having a hard time jumping off. We have to do something beyond making useless widgets efficiently. We have to find the means, the social movement, that can help us jump off the treadmill of endless growth.

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Chapter Four: Why Technology is Neither the Problem Nor the Solution

Real Answers

In the previous chapter, we looked at a number of ways that individuals can save energy and reduce their carbon output. From home appliances to better insulation, the options are numerous. A few questions come to mind. **If these options are so easy, why haven't we adopted them already?** Why are we so consumptive? How much energy will the tools and techniques that comprise our conservation wedges really save? What about alternative energy sources? Will conservation and alternative energy really be enough to prevent the Earth from dangerously overheating?

The real answers to these questions demand that we move beyond greenhype, beyond the easy cheerleading and simple changes in buying patterns to look at the hard facts about how our world is put together. At some level that may make the answers seem more difficult, because we have to set aside many of the illusions that make us comfortable. But if we can do that, we can move beyond overwhelming uncertainty and **get a clear look at what really needs to happen.** As we move beyond illusion, the answers get both more difficult and simpler. In the face of monstrous corporations and government power, many people feel powerless to affect large-scale change. We have to move beyond that feeling of powerlessness. The changes themselves are, at this point in history, relatively easy.

Peak Oil is Here

Any considerations of alternative energy and conservation must be founded on a recognition that **our oil supply is limited.** For decades, economists and "optimists" from all of the dominant forecasting agencies have predicted that global oil production would not peak for decades to come. Current indications are that they are wrong. Global oil **production has been flat now for several years** in spite of huge oscillations in prices. Most of the major oil fields in the world are in decline. The oil fields that are not in decline have to produce more and more oil simply to make up for the decline of the major fields, never mind increases in demand. **We are having to run ever faster simply to stay in place.**

The predictions about future oil supplies were based on clearly erroneous assumptions about reserves. Many years ago, OPEC made a policy that each nation's production quota was based on their reserve size. Almost over night, **numerous nations simply increased their on-paper reserves**, without making any new discoveries or employing any new technologies.[1] No one can be certain of the exact timing of the global peak of oil production, nor is the date itself ultimately important. As you know, the Earth itself is finite, and so is our supply of fossil fuel. We should be acutely aware that we may be colliding with the finite limits of our world sooner than has been so often predicted.

Peak Oil Exacerbates Climate Change

It should also be noted that a peaking of global oil supply is NOT a solution for climate change. The peaking of supply simply means that we have used about half of the oil available. Furthermore, we have used the easy half. The second half of available oil will be more expensive and energy intensive to produce and use, and thus will generate **more carbon dioxide per unit of useful energy.** Carbon dioxide originating from oil is only one piece of a much larger picture. The electricity you use, which is mostly produced from **coal, has more impact on climate change than does the oil you use.** The peaking and decline of oil production is inevitable, but it does not solve our climate change problem.

Is Renewable Energy a Solution?

As a response to peak oil and concern about climate change, alternative energy production is growing rapidly across the world. The future of alternative energy as it is painted by environmental writers varies from hopeful to wildly optimistic. Currently, alternative energy (including wind, solar, biomass, and hydropower) provide about 6% of the energy used in the U.S.[2] Wind and solar are the most popular forms of alternative energy because, apart from the costs of building such systems, the energy they provide is pollution-free. They are starting from humble beginnings, however, as solar and wind power currently provide only

1 Simmons, Mathew R., *Twilight in the Desert: The Coming Saudi Oil Shock and the World Economy*, John Wiley and Sons, Inc., Hoboken, 2005, p.273-276
2 Heinberg, Richard, *The Party's Over: Oil, War, and the Fate of Industrial Societies*, New Society Publishers, Gabriola Island BC, 2005, p.153

about 3% of the energy we use. **Installations of wind and solar are both growing rapidly.**

Solar electric power, also known as photovoltaics, started out decades ago as an extremely expensive source of electricity sensible only for powering satellites or other very specialized applications. The price has fallen steadily as production has increased. In the last few years in particular, the installation of photovoltaic panels has been growing very rapidly, and the rate of increase continues to accelerate. The amount of solar radiation reaching the Earth is enormous. **The amount of sunlight power reaching the average suburban roof is about 25 horsepower**, far more than is needed to power the home itself.[1] Photovoltaic panels capture only a small fraction of that power, around 15% in practical applications.

Although the cost of photovoltaic electricity has fallen enormously, it is still a relatively **expensive form of electricity**. There is also considerable disagreement on how much energy photovoltaic panels save given that it takes a lot of energy to create them. There are several new technologies on the market that promise to make solar panels much more cheaply through various kinds of thin-film technology.

Thin Film Photovoltaics

Traditional photovoltaic panels are made of high-grade silicon cells constructed in a highly controlled environment. New technologies allow a much thinner coating of photo-reactive material to be "printed" on rolling sheets of material, like newspapers are printed on enormous rolls of paper. Numerous companies are working on different variations of thin-film technology, and some are already marketing their products. (Some of the big players include Shell Oil, Nanosolar, as well as a number of European companies.) If the more optimistic scenarios manifest themselves, **the cost of solar electricity could fall dramatically.**

Wind Power

Wind power has been growing rapidly as well, in large part because it is cheaper than photovoltaic power. Like solar electricity, wind power has

1 Heinberg, ibid, p.156

seen a steady decrease in costs and an ongoing increase in efficiency. In the case of wind, the **increases in efficiency have come from turbines that can productively convert very low or high speed wind currents into electricity.** Only a few years ago, wind turbines could only operate in a narrow window of wind speeds, from 15-25mph. Newer turbines can produce power with wind speeds ranging from 7 to 50 mph as a result of improved blade and turbine design. The new generation turbines also turn more slowly, thus reducing the number of birds killed as a result of collisions with the turbines.[1] This is good, because many of the ideal sites for wind turbines – on mountaintops and along coastal areas – are also bird migration routes.

Wind Power in Europe

Various European countries have been expanding their wind generation capacity rapidly. **Denmark gets about 20% of its electricity from wind**, and Germany now has the largest overall windmill capacity.[2] Wind has the highest return on energy invested of any alternative electricity source. By some calculations, it is **already cheaper than fossil fuel sources.**

With wind energy, intermittency is a problem. If the electrical grid is to be kept alive, then the major utilities have to have spare generation capacity, from fossil fuel or other sources, to cover periods when there is less wind.[3] This duplication of generation capacity reduces the overall returns of wind power.

Solar Water and Space Heating

Homes and businesses designed to use solar energy for space and water heating are also viable sources of clean energy. Across much of the world, solar collectors designed to heat or pre-heat water for domestic use are the norm. The U.S. lags far behind Europe, Japan, and much of the world. Solar design that allows sunshine to heat living spaces is not high-tech. It is simply a matter of good design, of creating spaces that are warm, comfortable, and well-lit. Well insulated solar houses also stay cooler in the summer because the windows are properly shaded from the

1 Heinberg, p.153
2 Brown, Lester, ibid, p.187
3 Heinberg, p.155

high summer sun angle. In the fossil fuel age, energy has been extremely cheap, and we have ignored even the basics of good solar design. Living more consciously in a low-consumption, highly cooperative economy will involve **recovering these basics of good design.** Ultimately, we cannot build our way out of our ecological crisis. But by consciously choosing how we live, we can better harmonize our relationship with the world around us.

Thermo-Mechanical Conversion Technology

There is a new, little recognized alternative energy technology that stands to revolutionize how we use energy, and holds much greater promise than many of the more well-known energy sources. Thermo-Mechanical Conversion Technology (TMCT) has gotten very little attention. Standard internal combustion engines are very inefficient. They require high-grade fuel (gasoline or diesel) that is vaporized and combusted. Internal combustion engines rely on the expansion of combusted fuel as the driving force of mechanical power, while the heat generated by combustion is simply discarded. TMCT has the advantage that it can use almost any combustible material, and because it makes use of the heat from combustion rather than just the expansion of combusted fuel, it **more efficiently captures the energy contained in the fuel.** The practical efficiency of most internal combustion engines is around 20-25%. TMCT can convert almost any combustible, low-grade fuel to mechanical power. Experiments have consistently tested TMCT at 30-40% efficiency.

Coal, oil, and nuclear require highly centralized production facilities to be efficient and are thus controlled by wealthy corporations. Many alternative energy systems are by their very nature highly decentralized. No one can own the sun or the wind. TMCT, because of its ability to utilize very low-grade fuels, is also **much more decentralized in nature.** And because of its higher efficiency, it promises to support **"energy democracy"** on a new scale, bringing opportunity to the many poorer peoples around the world who so desperately need it.

While there are those who would claim that a "solartopia," windmills scattered across Africa, or the miraculous new "hydrogen economy" will provide energy to the masses in need of new economic opportunity, each of these technologies suffers from high start-up costs, and slow financial

paybacks relating to their relatively low efficiencies. Particularly in the case of the often touted "hydrogen economy," the infrastructure development costs are massive. TMCT has clear advantages. It is **cheaper, more efficient, and pays for itself much more quickly** than any of the aforementioned technologies. It can utilize low-grade biofuel or fossil fuel, and thus promises to revolutionize the future energy prospects of wealthy and poor alike.

The Limits of Technology

If the reader may forgive my little game, TMCT is steam power, and everything (save the predictions) I just said about it is true. Steam power is more efficient than internal combustion engines, and that is why it is the dominant form of energy conversion used in electrical power stations. **Steam power was the dominant form of energy conversion powering the industrial revolution up until recently.** Until a mere few decades ago, steam power was the dominant energy conversion process in ships and railroad engines. Steam power can use any low-grade fuel, though coal has been the dominant fuel because of cost.

The point is not that steam power will revolutionize our future. Clearly it will remain in use for electricity generation, and may find some expanded use in biofuel conversion, for better or worse. The first known use of mechanical steam power was in A.D. 62, and it has been invented dozens of times since then. (Steam power wasn't actually used for practical purposes until the mid 1600s.)[1] Remember when you hear about the miracles of hydrogen and other alternative energies, steam power is an efficient, diverse-fuel energy source that was created nearly 2,000 years ago. In discussing modern alternative energy options, **we tend to assume human society will automatically adopt the most efficient technology** and apply it to the benefit of all classes of people, and thereby maximize whatever revolutionary potential said energy source may hold. History teaches us exactly the opposite.

Steam power did not revolutionize the Roman Empire, or any of the other nation-states that came and went between A.D. 62 and 1600 because there was no need and no market.[2] (Even after steam power took

1 Wilkinson, Richard G., *Poverty and Progress: An Ecological Model of Economic Development*, Methuen and Co. Ltd. London, 1973

2 Africa, Thomas W., *Science and the State in Greece and Rome*, John Wiley

hold, the improvements in living standards were brutally slow in coming.) The Romans had no need for "TMCT" in the sense that, given the limited scale of the tasks of work being done at the time, simpler technologies were better suited. You don't build a steam boiler if all you need is a small wood fire to cook your soup. And there was no market as the citizens of archaic civilizations were too poor to support the widespread development of mechanical technology. The Romans also knew about oil, and made machines with interchangeable parts. Some highly sophisticated devices were made in that age.[3] But the economy was too simple, the people too poor, to support the rapid development of mechanical technology such as we have seen in modern times.

The Future of Alternative Energy

What does that mean for alternative energy in the modern context? Energy is not magic. Technology is not created by deities. They fit into a cultural context. Are we likely to provide hydrogen fuel cell plug in hybrid "hyper-cars" to the citizens of Darfur? **Will the use of efficient technologies among the wealthy lead to a transfer of life-sustaining wealth to the poorer classes of the world?** Will currently touted alternative energy technologies spread rapidly across the world without inhibition and revolutionize the way all of humanity lives? Based on our history, there is reason to think not.

Many alternative technologies are by their very nature decentralized. That would seem to argue that such technologies are likely to have a democratizing impact. The problem is that, in general, **alternative technologies are also expensive.** From a strictly economic perspective, fossil fuel energy sources (excluding nuclear) are cheaper than wind and solar energy. Such analysis fails to account for "externalities" such as pollution. As you can see with climate change, the costs of such "externalities" may be monumental in the end. **Trying to power the lifestyle to which you have become accustomed with wind and solar power would be extremely expensive.** So expensive as to be essentially impossible. We have grown accustomed to using cheap energy on an enormous scale. Furthermore, if we were not willing to bridge the equity gap across national boundaries using very cheap fossil fuel in an age of expanding energy supplies, why would we do so with expensive

and Sons, Inc., 1968
3 Africa, ibid

alternative energies in an age of energy contraction? **We do not have an energy problem.** We have a problem with how our culture is organized at a fundamental level. We have the power to organize our society differently.

Biofuel and Nationalism

Biofuels have become a measure of the extent to which environmentalism in the U.S. has taken a nationalistic turn. From an American perspective, biofuel looks great. From an international perspective, **it looks like genocide**. But the desire for a techno-fix is unstoppable, if ill-informed by history. Anyone who is cognizant of the history of biofuels knows the fallacy of thinking they are either new or a panacea. I examined the history of biofuels in more depth in my prior book *Culture Change*, so I will only touch on it here.[1]

The short version of the story is that the early phase of the industrial revolution was entirely biofueled. As a result, Europe was deforested almost entirely by 1650. Wood was easier to access than coal, and burned cleaner, but coal became dominant once easily accessible groves of wood were depleted. The U.S., in spite of having access to enormous forested land faced a similar transition by 1870. The woodlands of the east had been cut by then, and coal became the dominant fuel powering the growth of industry because wood was depleted. This fascinating story is told in an extraordinary though little known book called *Poverty and Progress.*[2] The most important insights contradict our cultural mythology, and are thus ignored. **We have standing forests today because we are NOT using them for biofuel.**

Such is the thumbnail history of biofuel that would lead to some skepticism about the viability of biofuel to power the modern economy. Nonetheless, ever since a few rugged individualists first started grabbing used fryer grease from behind restaurants a few years ago, the biofuel movement has exploded. I have published articles in a few small journals questioning the viability of the biofuel panacea to power the consumer society. Thankfully, many others have raised the alarm, and the **concern**

1 Zeigler, Alexis*, Culture Change: Civil Liberty, Peak Oil, and the End of Empire,* Ecodem Press, Charlottesville, 2007
2 Wilkinson, Richard G., *Poverty and Progress: An Ecological Model of Economic Development*, Methuen and Co. Ltd. London, 1973

about biofuel is growing. The European Union is now considering restrictions on biofuels made in an unsustainable manner.[1] But the forces that underlie the biofuel expansion – the insatiable demand for energy for our growth-based economy and the acute psychological need to find a solution that fits within the framework of our cultural mythology – has made the expansion of biofuel an unstoppable force.

Ultimately, **biofuel represents no more or less than the maturing of the global market economy.** In a market economy, the highest bidder gets the goods. In the twentieth century, population has grown, but the fossil fueled industrial economy has grown much faster. The U.S. is the dominant global super-power. We print the global trade currency. Being a member of the global upper class shelters you from the global impacts of your personal energy choices. The global lower class eats what vegetable oil they can get their hands on, while "waste" vegetable oil shows up behind our restaurants in the U.S.

Meat and other rich foods are consumed by the global North, often having been exported from the South, while people in the global South live on grain. **The U.S. is now the world's largest agricultural IMPORTER of food.**[2] We import meat and fresh fruits and vegetables in winter, and export grain. Overall, we import nearly as much as we export.[3] Global consumption of meats and fats has increased. But that trend cannot and will not continue.

The market economy has seemed like a benign and progressive force for most people around the world as long as there has been an expanding energy supply at the base of it. But that "waste" vegetable oil is a manifestation of the concentration of economic power and favorable terms of global trade that allow the wealthy to collect, eat, and wastefully discard the fat of the land. As our energy supply contracts as a result of the peaking of global oil production, **the fat of the land will not be so readily available to burn in our cars.**

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1 *Europe May Ban Imports of Some Biofuel Crops,* James Kanter, New York Times, Published: January 15, 2008

2 *The State of Food and Agriculture 2006,* Food and Agriculture Organization of the United Nations, Rome, *2006*

3 USDA, Economic Research Service, Foreign Agricultural Trade of the United States (FATUS): Monthly Summary

Biofuels and Climate Change

Biofuels are not a solution to climate change. Some recent studies published in the journal *Science* indicate that, on average, **biofuels add MORE carbon to the atmosphere than do fossil fuels**.[1] The scientists who conducted the studies concluded that the clearing of land to grow biofuels releases as much carbon as would be saved by 93 years of growing biofuel on the land. Thus, for 93 years after a biofuel farm is established, it is operating "in the red" as far as carbon output is concerned. The IPCC and other scientists have warned that we do not have decades or centuries to bring down our global emissions. We cannot afford to make investments in carbon reductions that do not begin to pay us back for a century. Over and over again the evidence is telling us that we need to change our lifestyles, not our energy source.

The Limits of Alternative Energy

A detailed examination of the viability of alternative energy to meet the expectations of global economic growth has been undertaken by Ted Trainer in his book titled *Renewable Energy Cannot Sustain a Consumer Society.*[2] The conclusions reached by Trainer are also supported by some of the information in another recent book, titled *Biofuels, Solar and Wind as Renewable Energy System: Benefits and Risks,* edited by David Pimentel.[3] The title of Trainer's book is largely self-explanatory. His book serves to deflate some of the illusions that alternative energies, such as wind or solar power, are infinitely available if only we could capture them. There are many limits on our ability to capture these alternative

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1 *Use of U.S. Croplands for Biofuels Increases Greenhouse Gases Through Emissions from Land-Use Change,* Timothy Searchinger, Ralph Heimlich, R. A. Houghton, Fengxia Dong, Amani Elobeid, Jacinto Fabiosa, Simla Tokgoz, Dermot Hayes, and Tun-Hsiang Yu, *Science* 29 February 2008: 1238-1240. See also Land Clearing and the Biofuel Carbon Debt, Joseph Fargione, Jason Hill, David Tilman, Stephen Polasky, and Peter Hawthorne, Science 29 February 2008: 1235-1238. Published online 7 February 2008 [DOI: 10.1126/science.1152747] (in Science Express Reports)

2 Trainer, Ted, *Renewable Energy Cannot Sustain a Consumer Society,* Springer, Dordrecht, Netherlands, 2007

3 Pimentel, David (ed), *Biofuels, Solar and Wind as Renewable Energy System: Benefits and Risks,* Springer, 2008

energies, including limits of supply, extreme variability, and the costs of building the complex systems necessary to capture and use such energy sources.

The optimistic assessments of a future powered by alternative energy imply that the industrial economy can continue to grow using alternative energy. Such assessments are not realistic. The geometric growth of consumption as it is compounded by the geometric growth of population means that **in order to provide a "middle class" standard of living to all of humanity by 2070, Trainer estimates that the economy would have to grow a stunning 60 fold.**[1] That in the face of a falling oil supply!

Variable Supply Limits Wind Power

Trainer argues that wind and solar are not as infinitely available as is often suggested. As has been the case with coal and oil in the past, the proponents of wind and solar energy often suggest that there are limitless supplies if only we invest in the infrastructure necessary to tap into them. As regards wind, the absolute supply is more constricted than is often suggested. Also, many of the best wind sites are far from the cities that need the energy. Piping energy thousands of miles is no small feat, and leaves the system vulnerable to intentional or accidental disruption. **The greatest weakness of wind is variability.** The wind may cease to blow over wide areas for days and weeks at a time, even in winter when energy demand is high and solar availability is low.

The extreme variability of wind has caused problems even at the low levels at which wind power is currently contributing to the power grid in European countries. With wind supplying about 5% of the power in Germany, power grid managers have struggled to use the power efficiently. It takes many hours to heat up a coal fired power plant to compensate for fluctuations in wind power supply. **Fluctuations in wind availability cause nightmares for power grid managers.** In Denmark, where 20% of electricity is nominally supplied by wind, the situation has been ameliorated by their ability to make up for fluctuations of wind supply with hydropower, and by exporting power. In a system that was entirely dependent on renewable energy, such export-buffering of a fluctuating supply would be less tenable.

1 Trainer, ibid. p.128

Variable Supply Forces Expensive Duplication

Solar energy also suffers from intermittent availability, but also from a high cost of production. Solar thermal may hold more potential for large scale production than photovoltaic power, but neither is reliable or cheap compared to the kind of on-demand, large scale energy to which we have grown accustomed.

For weeks at a time in the winter, little solar or wind energy may be available in areas of the northern hemisphere, such as Europe, when energy demand is high. The **intermittent availability of wind and solar energy means that massive energy systems have to be replicated at great financial and ecological expense.** In an economy that relies only marginally on renewable energy, the power output of thousands of windmills has to be replicated by coal and nuclear facilities. In an economy that relied entirely on renewable energy, the power output of thousands of windmills would have to be replicated by solar facilities that in turn have to replicated by.... who knows? Solar thermal storage, hydrogen? The problem with these latter replication schemes is that they are inefficient, meaning **three to four times as much wind/ solar/ wave/ etc. power would have to be generated in order to be stored to make up for those weeks of cloudy, still weather.** The magnitude of the replication of systems becomes extremely difficult if not impossible.

The point is not that there is something fundamentally wrong with alternative energy. The point is that you have grown accustomed to using energy on a scale, and on demand, in such a manner that it will be virtually impossible to meet with renewable energy. And even if we did miraculously meet that demand, what would that mean? The consumer economy would continue to extract and destroy resources at an extraordinary and unsustainable rate. Renewable energy cannot sustain the growth-based economy on a finite Earth, and you should not wish it to do so. **Our expectations concerning energy use are grossly out of line with the physical realities of the world in which we live.** It is important that we eventually rely on renewable energy, which requires a huge reduction in per-capita energy use.

The Club of Rome and the Limits to Growth

The work of the Club of Rome fits into the category of insights that are terribly clear, and even obvious at one level, but so fundamentally contradictory to our mythology that they are all but ignored. The Club of Rome published a book in 1972 that caused an uproar. The book was entitled *The Limits to Growth*.[1] The essential thesis of the book is that **geometric growth (as represented by the industrial economy) cannot continue indefinitely on a finite Earth.** And, if growth is allowed to continue for too long, then collapse becomes unavoidable. *The Limits to Growth* has been updated twice in the last 30 years, and the message remains the same.[2] Just like yeast growing in a petri dish, humans are at risk of consuming resources and generating pollution at a rate that ultimately leads to the overshoot of our ecological support systems and a rapid contraction.

At one level, speaking of humans is if we could expand and collapse like a population of yeast is shocking. At another level the finite nature of the Earth is terribly obvious. The base study of the Club of Rome attempts to understand global economic and ecological systems through a computer model that relates resources, industrial and agricultural production, pollution, and population growth. In this base study, the peak of growth occurs around 2035 AD. The surprising result of the Club of Rome studies comes when one increases the availability of resources. If one doubles all of the available resources on the face of the Earth, the model shows a peak of population around 2045 AD. How could it be that **a doubling of resources leads to only a ten year addition to the trajectory of industrial growth?** Because of the geometric nature of economic growth. The economy feeds on itself, each year's growth being a cumulation of all the growth that came before. The growth curves bend upward as a parabola, not a straight line, because of the geometric nature of growth. This points to the futility of finding new energy sources to feed the blind culture of consumerism and empire. It can, and will,

1 Meadows, Donella H., *The Limits to Growth: A Report for the Club of Rome's Project on the Predicament of Mankind*, New York, Universe Books, 1974 (first published in 1972)

2 Meadows, Donella, *Beyond The Limits, Confronting Global Collapse, Envisioning a Sustainable Future*, Chelsea Green Publishing Co., Post Hills, VT., 1992, Meadows, Donnella, Jorgen Rogers, Dennis Meadows, *The Limits to Growth, The 30 Year Update*, Chelsea Green, White River Junction, VT, 2004

consume anything in its path.

Our Addiction to Growth

As I have been traveling around with my book *Culture Change*, I have been presenting a slideshow that includes the Club of Rome graphs. People listen attentively. The Club of Rome pointed out that there are ultimately many limits to industrial growth – minerals, energy, food production, clean water, and the list goes on. **The removal of one or even several limits does not influence the shape of the curve** in the long term because if one limit is removed, industrial growth will collide with other limits. The Earth is finite. That is terribly obvious, common knowledge to everyone, and yet a blatant contradiction to the nature of industrial growth. An awareness of the most common-sensical fact, the finite Earth, is in contradiction to most of what is said on the daily news, most of what is said in the halls of academia.

The point of presenting the graphs in the slideshow that I have been conducting is that new energy sources – be they cold fusion or some miraculous form of limitless biofuel – will not change the equation. Remember, a doubling of **ALL** of the resources available to humanity in the Club of Rome computer model prolonged industrial growth by about a decade because that growth simply collided with other limits.

I ask people in my presentations to forget the complex debates and answer a simple question: what if we found some prolific new biofuel that allowed us to drop gasoline back to $1 per gallon? What would happen then? They respond that we would go back to buying ever larger SUVs, suburban sprawl and consumerism would continue. Then I ask them, “So if a new energy source does not help us in the overall picture of achieving sustainability, why are we looking for new energy sources?” It's a provocative question, and yet it is no more than common sense in the end. The Earth itself is finite. **If our use of its "resources" is destructive and unsustainable in nature, then adding a new energy source will only accelerate and exacerbate the destruction.**

Diagnosing The Real Problem

We have a problem with how we are organized socially, not with our

energy supply. Our blind culture inhibits our ability to adapt to the future or to recognize and discuss the most common-sensical aspects of our circumstance. We do not have an energy problem. We have extraordinary volumes of energy at our disposal, but we use it wastefully because the economy rewards us for doing so. We are blind to the social implications of our personal choices. The culture as a whole operates as a blind system. The solutions are social, cultural and economic, not technological. Then at the end of my slideshow I invariably get asked, "What about cellulosic ethanol? What about hydrogen? Can't they power our industrial economy?" Our cultural mythology is resilient, resistant to challenge and change. We want a techno-fix, we want it desperately.

Throughput

I want to be clear about why our society is so consumptive in the first place. We tend to write off the question as insignificant, assuming greed and consumption are so much a part of human nature that we cannot address them and need not concern ourselves with fixing such immutable things as human nature. Personal greed is not the problem, nor is it "human nature." The problem is that **there are tremendous benefits to ecological destruction in our current social economic order.**

A lump of coal in the ground is economically worthless. But if that lump of coal is dug up, purchased, and burned, the economy grows stronger. The coal becomes throughput, and **the greater the throughput, the more powerful our economy becomes.** In a sense, it doesn't matter how efficiently the coal is used, or if it is even wasted, because as long as it is bought and sold, economic activity increases.

The same is true for a tree in the forest. It holds value in the creation of clean water and oxygenated air, but that is not easily valued in our current economy. Whereas a tree cut down, milled into paper napkins which consumers blithely throw away by the fistful is a powerful economic stimulus. And that is the unspoken reason why we throw away napkins, disposable soda bottles, electronics, appliances, tools and toys of all sorts, because **wasteful behavior provides a powerful economic stimulus.** So powerful that the U.S. has become the conduit through which much of the world's wealth must travel.

If one speaks of the global north as those nations which are already

highly industrialized, and the global south as those nations which are not, then the net flow of raw materials is from south to north, **and the net flow of money (in repayment of often ill-advised loans) is from south to north** as well.[1]

Ghandi's Economy

The more we consume, the richer we get. **The more we destroy, the more powerful we become.** It is no secret at all, no grand insight, that the economy of "compulsive consumption" is economically useful, at least in a short term sense. It has been recognized for many decades.

The stimulus provided by the consumptive economy in terms of maintaining employment and building wealth is obvious enough, but I would also point out that there are powerful military advantages as well. The same iron mines and smelters that make steel to make SUVs also make steel for tanks, ships and guns. **The economy that trades trillions of dollars worth of resources can afford hundreds of billions in military hardware.**

Mahatma Gandhi urged people to “live simply so that others may simply live.” But Gandhi's economy could not afford to spend money on the military like the current industrial powers. Thus Gandhi's economy is contingent on a different form of international problem-solving than that which prevails currently. And that is the reason **our lifestyle is inextricably tied to the world order, world politics, and world economics.**

Throughput is Power

In an ideal world, every person and every nation would not necessarily be completely equal, but each would at least have access to what they need to survive and thrive. This is more than a nice idea. **Gross inequality means war**, and the scale of growing inequality in a world

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1 *Odious Lending, Debt Relief as if Morals Mattered*, The New Economics Foundation, 3 Jonathan Street, London, SE11 5NH, http://www.neweconomics.org/gen/, also George, Susan, *A Fate Worse Than Debt*, Grove Weidenfeld, NY, 1990, p.63, see also Third World Network, http://www.twnside.org.sg/pos.htm, See also Jubilee 2000 debt campaign; the Ethical Trading Initiative; the UK Social Investment Forum

with a shrinking energy supply could mean war on a new scale. If what we want is a global scale war between the "haves" and the "have nots" that stretches on for decades and engulfs every people and every nation on the Earth over time, then continuing the current approach to "greening" the high-consumption society will likely deliver us to that end.

We are facing an escalating level of resource competition in the world today, particularly for oil. Finding a means to distribute and trade world resources in the absence of warfare is absolutely critical because, not only is war itself terribly expensive, but the fallout is that **our culture is blinded by such competition and trapped on a dead-end of hyper-consumerism to support our dominion.**

Conscious Culture

It is hardly more than common sense to recognize the economic power of compulsive consumption. The military and imperial advantages of throughput are less often recognized, but also fairly obvious. But our great failure is our unwillingness, across the political spectrum, to recognize that such economic advantages have a **dominant** influence on our own beliefs. ***We do not consume like there is no tomorrow because we are greedy or selfish, we act as if we are greedy and selfish because there is such a powerful economic and military payback for doing so.*** It runs counter to the foundations of our belief system, the mythology that holds our culture together, to suggest that our beliefs follow economic necessity rather than lead them. But that is precisely the truth.

Understanding the economic influences over our beliefs is terribly important because the level of change that is demanded of us in order to address climate change cannot be achieved using the old tools. This is a new scale of problem. The foundations of industrial society are threatened. The easy liberal solutions of improving the efficiency of the individualistic, highly consumptive society on a person-by-person basis without putting that personal conservation into a larger cultural and political context will not work because, given the coming contraction of the energy supply as a result of falling oil production, high consumption cannot be maintained in the global north without a genocide in the global south. **Our blind culture cannot gracefully adapt to the momentous changes that we face.** A culture that was conscious of the long-term

process of cultural evolution could make faster, wiser, more humane choices. Creating that culture is ultimately our only hope for successfully navigating the coming age.

Throughput, Power, and History

I stated earlier that "TMCT" did not take off in Roman times because the citizenry was too poor to create a mass market to facilitate the commercial development of such technologies. That is true, but it begs the question: given that the Roman Empire endured in some form for about 1000 years, why did they never in that long history reach a take-off point where mass markets could form?

It has been suggested that **slavery serves to suppress the development of economy and technology** because labor is so cheap and a great deal of effort is put into maintaining the status quo. It has been postulated that such defined the difference in development between North America and Central/South America. In the U.S., slavery was abandoned after the Civil War, whereas in Latin America slavery and its progeny – various forms of latifundia or semi-slavery – endured much longer. Even though the Americas have similar resources available to them, it has been suggested that the **persistence of slavery and semi-slavery in Central/ South America retarded economic development there**, at least in a relative sense.[1]

Slave states and democratic societies distribute power differently. The right and ability to consume is a form of power. Restraining the ability of the lower class to consume is a form of social control. In other words, in highly stratified societies, **the upper classes consume wastefully as a means of maximizing throughput, which maximizes their social and economic power.** The upper class, in as much as they have disproportionate influence over the choices a society makes, will restrict the amount of energy and technology that is available to the lower class as a means of restricting their power, ***even if it is economically and ecologically possible and profitable for the lower class to have greater access to energy, technology, and material resources.***

Part of the reason that steam power, or almost any other form of mechanical assistance, never developed among the masses of ancient

1 Harris, Marvin, *Patterns of Race in the Americas*, New York, Norton, 1974

civilizations is partially the result of the desire of the upper class to hold control, not just the lack of economic viability of the technologies themselves. **Energy and consumption are political power.** The upper class holds a tight control on power. This is terribly important for us to be aware of in our age, because you and I are part of the global upper class.

Why Americans Drive SUVs While Starvation Grows

The primary restriction of alternative technologies around the world, be they wind, solar, biofuel, hydrogen, or whatever, ***will not be their market viability in a strict economic sense.*** It will rather relate to the willingness of the citizens of the industrialized societies – people like you and me – to allow the lower classes access to technology, energy and consumption by reducing our own consumption dramatically, educating people, and changing our political culture.

The economic analysis that demonstrates how cheap it would be to spread sustainable and alternative energy around the world is a terrible fallacy. The right of throughput is a carefully guarded, bitterly contested, right. **The economic viability of alternative energy will not determine its spread**, any more than the purely economic viability of "TMCT" determined the spread of that form of energy in archaic times. Mind you, the Romans did not even make much use of wind or water power until late in the Empire, and then only on a limited basis.[1] Wind and falling water are terribly easy to harness, simpler even than "TMCT." The simple explanation is that there was no mass market, that slave labor was cheap. That's true. But on a larger scale, over the centuries of time during which this condition persisted for the Romans, it can only really be understood as a choice on the part of the ruling classes to limit the access of the peasant and slave classes to technology, energy, consumption – throughput – as a means of limiting their power or their potential ability to upend the social order.

As energy becomes more expensive in our age, you can predict its availability to the poorer classes will be restricted simply because of price. But you can also expect that the **dominant factor restricting the expansion of alternative energy will be the desire of the ruling classes**

1 Africa, Thomas W., *Science and the State in Greece and Rome*, John Wiley and Sons, Inc., 1968

to control the throughput of the global lower class. That is why people in the U.S. drive SUVs while other people all over the world struggle to feed themselves. All of the calculations about the costs and marketability of alternative energy are nearly meaningless. The pivotal factor is power, the power embedded in throughput. If the argument sounds somewhat foreign, it is only because the discussion of class and power has been all but purged from modern society.

We Have Already Reached Numerous Limits

Biofuels are going to accelerate the polarization of our world, breeding genocide of the poor for the sake of feeding the throughput economy of the rich. **We have already reached a number of the limits of what our Earth can give us,** especially when you look at the per-capita supply of resources. The current preponderance of evidence indicates that an absolute peak of global oil production appears to be happening now.[1] The per-capita peak in global fish catch occurred in the mid 1980s.[2] Global grain production per-capita grew rapidly up until the 1980s, and has been struggling to grow ever since.[3] Irrigated farmland is our most productive farmland, and the amount of irrigated land we have has actually been shrinking because of salinization, erosion, and other land management issues.[4] We have been expanding the global grain supply in spite of all of these factors by investing more and more energy per unit of production. More fertilizer, more pesticides, and genetically engineered seeds have allowed us to produce more, but only with increasing inputs of energy. The result is that, as mentioned earlier, the food on your table has about 10 calories of fossil fuel embedded in it for every calorie of food value.[5]

We are already at or near a number of productive limits. The car-versus

1 Heinberg, Richard, *The Party's Over: Oil, War, and the Fate of Industrial Societies*, New Society Publishers, Gabriola Island BC, 2005, Simmons, Mathew R., *Twilight in the Desert: The Coming Saudi Oil Shock and the World Economy*, John Wiley and Sons, Inc., Hoboken, 2005, Campbell, Colin J, *Oil Crises,* Multi-Science Publishing Company Ltd, Essex UK, 2005, see also http://theoildrum.com/ and http://www.energybulletin.net/

2 Brown, Lester, *State of the World 1993*, Norton, NY, 1993, p.12

3 Brown, 1993, ibid., p.13

4 Gardner, Gary, *Shrinking Fields: Cropland Loss in a World of Eight Billion*, WorldWatch Paper 131, WorldWatch Institute, 1996, p. 20

5 Pfeiffer, Dale Allen, *Eating Fossil Fuels: Oil, Food and the Coming Crisis in Agriculture,* New Society Publishers, 2006

human battle that is looming promises to be very, very bloody, far more so than any of the great wars we have faced. It takes ten acres of corn to feed an SUV ethanol for a year.[1] (Some people say that ethanol from corn is a net energy loss. Even at best, it is an inefficient gain, especially compared to oil.) The world supply of grainland is about three-tenths of an acre per person, and is expected to shrink to less than a quarter acre per person by 2020.[2] In other words, the land that is required to feed one SUV corn ethanol for a year would feed 25-30 people.[3] Ethanol produced from sugar cane or biodiesel from palm oil has a much higher energy return. That's good, right? It's so terribly hard to get it across. ***Any gain in efficiency of production will be quickly swallowed by the throughput economy and used to maintain the existing power structure until and unless that structure is changed.*** Producing energy is not the problem. The same point can be made about all the high-tech energy sources that are being debated these days, from nuclear power to cellulosic ethanol to wind-powered plug-in hybrid cars. Not all technologies are equal, but the ecological crisis that we face is not a technological problem, and it cannot be solved with new energy sources.

Energy Scarcity, Price Oscillations, and Human Well-Being

Given the growth of population and consumption on a finite planet, it is inevitable that commodity prices will rise. Given the per-capita limits we have already surpassed, you can expect energy, food, and other basic commodities to grow in price relative to earning capacity of most of humanity.

So much of how we talk about climate change and other environmental constraints assumes that we will all suffer if we don't wise up. The reality

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1 Pimentel, David, *Energy and Dollar Costs of Ethanol Production With Corn*, M. King Hubbert Center, Petroleum Engineering Department, Colorado School of Mines, Golden CO 80401-1887 at http://hubbert.mines.edu/news/Pimentel_98-2.pdf

2 Gardner, Gary, *Shrinking Fields: Cropland Loss in a World of Eight Billion*, Worldwatch Paper 131, Worldwatch Institute, Washington D.C., 1996, and Brown, Lester, World Watch Institute, *The State of the World 1997, A Worldwatch Report on Progress Toward a Sustainable Society*, W.W. Norton, New York, 1997

3 Brown, Lester, *Supermarkets and Service Stations Now Competing for Grain*, Earth Policy Institute, July 13, 2006

is that the poor are already suffering. Furthermore, the wealthy and powerful classes of the world are, in our globalized and commercialized age, going to try to continue to use their buying power to avoid the suffering brought on by climate change.

The number of malnourished people on the planet Earth was falling for decades until the late 1990s, at which point it began climbing again.[1] That was ***before*** the oil price oscillations of the last few years that triggered severe oscillations in the grain markets. The growth in food prices is closely linked to increasing biofuel competition for food supplies.

At the international level, prices for energy, food, and other commodities are going to continue to grow in the coming years. The statistics of human well-being tend to lag behind those for prices, **but the impacts of the last couple of years of energy and food price oscillations will soon be seen in the undernourishment statistics worldwide.** Now that food and fuel are directly linked via the biofuel market, given that we live on a finite planet that is reaching its limits, we are going to see dramatic changes in the well being of the less-wealthy people of the world.

The Lie of Growth

No one wants to say it, but **the reality of climate change and escalating prices for energy is going to be escalating starvation and misery across much of the world.** Will mass starvation in the poorest areas of the world compel us to stop driving, stop flying, stop consuming so much? Will we try to hold on to our lifestyle, our ability to eat the best and richest food from around the world, our ability to travel at will, while the rest of humanity collides with the hard wall of environmental limits?

The great age of growth allowed us to set aside for a time the terrible inequities underlying a market economy and has thus de-fanged the great ideological debate about inequity, ownership, and class. For most people in most places in the world, industrial growth in recent decades has brought benefits at a material level. And there is not another economic system to which anyone could turn.

1 *World Hunger Increasing, FAO Head Calls on World Leaders to Honour Pledges,* UN FAO, 30 October 2006, Rome

The great illusion of the market system, the great lie that growth will continue and that it will be to everyone's benefit, is about to unravel on a colossal scale. The wave of industrial growth is going to collapse like a wave colliding with the beach, from the bottom up. The wealthy and powerful classes are going to try to surf economic distress, they are going to try to stay on top while those under them bear the brunt of ecological limits. Moral reservations about that situation are likely to be cast aside by the wealthy. Social Darwinism, which celebrated the death of tens of millions of people in the famines of the late 1800s, will be born anew in the coming age of contraction.[1] Communistic, socialistic, and messianic movements will be re-kindled among the poor.

We tend to think of our minds as being above matter, of our political and moral consciousness as being somehow above any direct relationship with economic concern. Nothing could be further from the truth. The great output of industrial growth has allowed us to ignore differences in class interests. **The battle of fundamentalisms is the leading edge of class struggles to come.** As prices for food and energy grow, more and more people will be driven to support extremist and militarized movements, be they western governments or Muslim militants. Western governments are going to shift right, including those in Europe, because that is the only means by which they will be able to maintain their position of privilege. **The intent of liberal politicians will be trumped by structural economic demands that will make their policies look remarkably similar to those of more "conservative" leaders.**

The liberal idea that you can play nice with the underprivileged of the world, provide them with some material support, AND maintain our consumptive lifestyle via conservation technologies is a lie. **The overall global energy pie is now shrinking.** Climate change and ecological depletion will increase the pressure. The only way we can continue to consume so much is by claiming an ever greater slice of that pie. To maintain our consumptive society, even with our conservationist technologies, we will have to maintain an aggressive foreign policy that allows us to take resources from around the world. Is this the future you want?

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1 Davis, Mike, *Late Victorian Holocausts, El Nino Famines and the Making of the Third World*, Verso, London, NY, 2001

Our Responsibility

Discussions of climate change, peak oil, and ecological limits are almost always nationalistic, even when they pretend they are taking a global perspective. The underlying idea that the citizens of the global north could, should, and will continue to live in spacious private homes, drive private cars, and otherwise continue our lifestyle by using more efficient appliances, building more efficient buildings, and buying hybrid cars while the rest of the world slowly catches up is a lie, a great deception.

If the Earth were larger, AND (not or) if we had a lot more oil, then a sustained improvement in the efficiency of the industrial economy could be adequate to address the current growth of population and resource use without genocide of the world's poor, but only for a time. Given the size of the Earth relative to current population and resource usage, and given the current likely state of our oil supplies, **incremental changes in efficiency among the wealthy classes of the world are not enough to turn the growth curves of resource use downward.** Given the gap between the predicted growth in demand for energy, food, and other vital resources and the decline of availability of oil and other resources, catastrophic collapse and polarization becomes an unavoidable outcome if we remain on the current path.

We are facing an unnecessary apocalypse. We have convinced ourselves that greed and the drive to consume more and and more are "human nature," an unavoidable circumstance. Nothing could be further from the truth. The drive to consume more and more is not simply the result of personal selfish choices. It is a social choice, a choice driven by economic institutions seeking dominion.

The poor of the world are not going to silently die while we consume the last of what is left to run our cars, air conditioners, and tumble driers. The environmental message as it is being propounded in America is neutralized of political content, as if all of the people of the world are going to share the same fate. But ecological sustainability, war, and international equity are inextricably linked. The blind cultural system has brought us to where we are consuming a long string of lies, the biggest lie being that unsustainable industrial growth will be good for everyone. The lies are going to unravel. Your job is to unravel them systematically, not piecemeal. O**ur work is to reduce consumption while creating a**

new kind of social and economic awareness.

Our unnecessary apocalypse can be avoided by wedding conservation technologies with reduced personal consumption and greater international equity. The job doesn't get more difficult by bringing such "issues" together, rather **a systematic and effective approach demands that we integrate our movements.** The magnitude of the changes we need to undertake may seem unthinkable. But the unthinkable is going to happen. We cannot avoid it. The political stasis that underlies the current conformity is going to unravel. At the top of the growth curve, we get a window in history, an opportunity to change as the old paradigms unravel and the old systems fail. If we make use of that window effectively, we create a sustainable economy and a conscious culture. The changes are upon us whether we like it or not. We can only lead history or be led by it.

Chapter Five: Real Solutions

The word sustainability is used often as a qualifying term rather than an absolute, but ultimately we will achieve absolute sustainability whether we like it or not. Ultimately, sustainability will be defined by the absolute limits of the living systems and resource reserves of the Earth, not by our efforts to "move toward" some abstract concept of sustainability. The only questions are how much of wild nature will survive, and how many people will survive the transition, and in what condition.

We can make the transition to a sustainable world gracefully. **The problem is primarily cultural and economic, not technological.** We have known how to live sustainably for thousands of years. We have chosen to dominate other tribes, nations, and economies instead. The process of organizing and motivating people to participate in that dominion creates a blind culture, one in which we are taught not to see or analyze our roles in the larger culture or our impact on the future of society. A sustainable society will have to be built on a conscious culture. It cannot be done any other way.

It's Not Just Green Consumerism

A conscious culture would not be made up of people who just buy organic, fair-trade goods and elevate their personal consciousness. It will not be made up of people who just buy "green" products and use them within the context of wealthy, western lifestyles. It will be made up of people who understand their role in larger systems and choose to consciously, systematically choose their economy, their transportation, their housing, their food, their political structures, everything about the way they live, **even if it means significant changes from past ways of living.**

The argument that people are going to do what they want to do, exercising their right to live in large private houses and drive private cars no matter what we do is rationally wrong and simply isn't going to work. **If you were accustomed to a more community oriented lifestyle, and someone tried to force you to live in a suburb, you would rebel.** You would find it isolating and offensive to your dignity. Given that our economy is dependent on our maintaining a high level of consumption,

and given that our consciousness is heavily influenced – in contradiction to everything we are taught – by what is profitable for our economy, we worship our own lifestyle.

We can, we must, develop the ability to choose our economy, our social and political structures, and our consciousness. Because the release of carbon is so unavoidable as we expend energy, because climate change reaches so deeply into the heart of industrial growth, **we cannot address climate change or the larger ecological crises that we face with small changes.** We must understand the real roots of the problem, and act on that knowledge.

Orders of Magnitude, Not Increments

Some scattered writers have raised environmental concerns about the rapid growth of human numbers and impacts dating back for centuries. In the last 40 years, there has been a plethora of scientists and writers who have pointed out the costs and dangers of a rapidly growing industrial society. Naturally, most writers want to be heard; they want to have an impact. The argument that we need to incrementally reduce our consumption of energy and other resources has become dominant because more radical structural changes to our society seem more remote, unlikely, or politically impossible. Politics aside, we have to recognize that the ratio of humans to resources has changed drastically since the arguments for improved efficiency first became prominent in the early 1970s. **As industrial society matures, moderate improvements in efficiency become more and more divorced from the physical realities of a human civilization in overshoot.**

The balance of the number of humans alive today and the supply of resources that support modern industrial society is a highly complex calculation that I am not going to try to summarize. However, as the environmental crisis matures, the rational (not political) answers to the problem point to **structural changes in our society that can bring about a geometric reduction of resources.** In other words, we need to be thinking about reducing our impact by orders of magnitude (an order of magnitude being a factor of ten, so one order of magnitude reduction would represent a 90% reduction) rather than by small percentages.

The Danger of Compounding Trends

No one can "prove" exactly what is necessary to bring about a sustainable society. It is clear, however, when one looks at the compounding trends of our current circumstance that slow, incremental changes will not suffice. We are facing a human population that is still growing (and needs to stop growing, which is addressed in the second section of this book). We are facing escalating costs from climate change, soil degradation, fresh water shortages, as well as the depletion of numerous natural resources. Our oil supply is very likely to begin contracting in the next few years. It is not clear how humans will feed themselves without fossil fuels a century from now. We have some time to work on that problem. But if current trends continue, **we are going to face an acute crisis of the impacts of these compounding problems in the next decade.** These impacts are going to manifest as economic and political convulsions. In that sense, **the long term causes of immediate problems will remain hidden from us.**

All of this does not mean the situation is hopeless. **Even with peak oil, we still have an enormous volume of energy at our disposal.** Though we often ascribe mythical powers to technological change, we nonetheless have some very powerful technologies at our disposal. We have access to a tremendous store of resources, and extraordinary means of communication. From the perspective of basic physics, **a sustainable society is clearly possible if you and I and the many other members of the global upper class engage in a geometric reduction of resource use even as we move to address the other pieces of the puzzle.** An incremental reduction of consumption, though it is a much easier proposition to sell, is inadequate to address the compounding nature of the ecological and social crises that we face at this time.

Simple Impossible Solutions

Achieving a geometric reduction of resource use, and carbon pollution, is easy if we assume that we have the ability to choose our own culture, to choose how we live. A geometric reduction of resource use is not possible by solely focusing on small improvements in efficiency within your current lifestyle because the up-wedges of growth and consumption will decisively overshadow the down-wedges of conservation.

We need an approach to conservation that can 1) support the building of an effective social movement 2) while geometrically downscaling our resource usage even as we 3) move decisively toward greater global equity. These are challenging times in which we live. But we have extraordinary tools at our disposal, and history is providing us with clear indications of the need for more decisive action.

How do we make conservation wedges into a geometric reducer of resource consumption? By applying them in a different social structure, a social structure that we consciously choose. Why are fossil fuel machines so popular anyway? Because they are cheap to buy even though they use of a lot of energy to run. Or, another way to say that, they have a low up-front cost and a higher relative running cost. Thus, they are often well-suited, at least in an economic sense, to highly individualized living. Alternative energy systems, by comparison, often have a higher up-front cost and a lower running cost.

How Lifestyles Economics Influence Energy Choices

When I am traveling with my slideshow, I ask a question to my audiences when I am talking about energy and culture that demonstrates the practical significance of lifestyle as it intersects with the costs of different kinds of machines. The question goes something like this: Suppose you are a young woman living alone with a job, a car, and an apartment. You come home from work and watch television for a while. Perhaps you are concerned about the environment and you have a couple of compact fluorescent light bulbs in your apartment. Fair enough, you have saved perhaps a hundred watts of electricity. Then you decide you want to do laundry and take a shower. You know that it would be nice to have a solar-powered water heater and an efficient front-load washer, but instead you are using the electrically heated water provided by the owner of the apartment building who wanted to maximize his profit by installing a cheap water heater. Even a small solar water heating system costs thousands of dollars, and all you want is a shower! Are you going to invest many thousands of dollars in solar gizmos, or are you going to stuff your clothes in the inefficient top-loading washer in the apartment, take a shower, stuff the clothes in the tumble dryer, and go to bed?

The simple, cost-effective thing for the individual to do is to use what is

available – electricity from the grid, originating from coal-fired power plants. Alternative energy is a nice idea, but solar hot water heaters are expensive, solar electric even more so. Is the young woman in question going to get it together to do the research, get the funds together, and spend that kind of money on alternative energy systems? Highly unlikely. More importantly, ***if we are talking about global solutions, is it even possible to apply expensive alternative energy systems on an individual or single-family basis on a global scale?*** The answer, very clearly, is **NO**.

Then I ask another question of my audiences. If you drive around your town, wherever you live, where do you see solar hot water panels? On car washes. So are the people who own car washes involved in some kind of secret ecological cult? What's going on there?

It's simple economics really. The young woman in her apartment doesn't use a lot of hot water or energy (relative to the current cost of energy). Especially as measured against her income, energy expenses are relatively trivial. The car wash, on the other hand, uses a lot of hot water. For the young woman, the low up-front cost of a cheap water heater and appliances relative to the moderate running cost under light usage favors, in a purely economic sense, a cheap, fossil-fuel machine. For the car-wash owner, the heavy use of water favors spending more money on a solar water heating apparatus that will pay for itself by providing bountiful cheap hot water for years to come. For the car-wash owner, **the higher up-front cost of energy saving equipment is offset because of the intensity of use.**

The Ecological Movement That Actually WORKS!

If alternative energy cannot sustain a high-consumption society, and marginal gains in efficiency are inadequate, where does that leave us? It leaves you with some oddly simple solutions.

Individual improvements in efficiency add up mathematically. If you tune up your car and improve its gas mileage by 10%, then you have saved 10% of the fuel costs of running the car. That is an arithmetically accrued savings. But if you put another person in the car, you have saved 50% right off the bat. Four people in the car puts you at 25% of original per capita energy use. Fifty people in a bus.... gets a little more

complicated, but the point should be clear. ***Individual*** **improvements in efficiency accrue very slowly.** ***Cooperative*** **improvements in efficiency accrue geometrically.**

The magic happens when alternative energy and cooperative use are brought together. **Geometric reductions in energy use are easily achieved when alternative energy systems are used cooperatively.** Personally, I think our sustainable future is devoid of private automobiles of any kind. But to keep the math simple, let's look at the model of cooperative auto use. Lets compare:
Average gas mileage for a single occupancy vehicle = A
Large investment to improve efficiency of single occupancy vehicle = ½A
Four people in standard vehicle = ¼ A
Four people after large investment to improve efficiency of single occupancy vehicle = (½ A) X (¼ A) = 1/8 A (nearing an order of magnitude reduction).

As with the solar hot water panels on the car wash, the geometric savings and intensity of use achieved by cooperative use favors alternative energy systems. What if the cost of conservation technology is four times that of ordinary technology? Then, in the former analysis, our cost (depending on the ratio of up-front cost to running costs) could reduce the financial saving from 1/8 A to ½ A. Still, you come out ahead. One needs to keep in mind though that 1) fossil fuels are artificially underpriced to a radical degree because "externalities" like pollution are not taken into account 2) fossil fuel costs are going to rise geometrically as supply tightens in the next few years 3) alternative energy systems costs are going to rise as well because of their linkages to the broader economy, but they are not going to rise as fast. In short, **you should expect to see a leveling of the playing field between alternative and conventional energy systems in the future.** That will be the context of an all-around belt tightening, which I will discuss later on.

The Cooperative Multiplier

With cooperative use, you get a multiplying factor. The savings are multiplied while the capital investment is divided. **If you need to cut your energy use by an order of magnitude (10 times) in order to achieve both sustainability and some degree of equity, that easily**

comes within reach with cooperative use. It is impossible with simply improving personal efficiency. If you find one of those 101 Ways to Save the Earth kind of lists, and you do it all religiously, you might save a quarter of the energy you use, not nearly enough to address our problem. If you do that in cooperation with other people, you get a multiplying factor. The savings of the alternative energy system is multiplied by the number of users. Geometric gains are easily achieved.

Does it work that way in the real world? Mostly, it does. That is a BIG DEAL because a lot of the hype about a "solartopia" based on solar, wind, and other forms of alternative energy is just that, hype. It does not work in the world of individualistic hyper-consumption. Once you cross-pollinate alternative energy with cooperative use, then it is possible to maintain a high standard of living with far less energy than you currently use.

Given the high costs of alternative energy systems, the pay-back (whether measured in financial or ecological terms) can be long, or non-existent when used on an individual basis. **When a mechanical system is used more intensively/cooperatively, the cost per unit of output goes way down.** Cooperative use of alternative energy systems easily achieves a geometric reduction in energy use. Nothing else can while maintaining a high standard of living.

If, instead of a washer in every apartment, a group of people share a community laundry, then the economics will be apparent for whoever is managing that laundry. Get a set of solar hot water panels and efficient, industrial quality washers that are repairable! You cannot expect ecological consciousness to somehow float above the matter of the real world. **Cooperative use is THE difference between what actually makes sense and ineffective cheerleading.**

The Magnitude of Necessary Change

Various scientific panels and environmental groups have set goals for what level of reduction of carbon output is necessary to stabilize climate change.[1] For the scientific panels, the question is presumably a matter of

1 Pearce, Fred, *With Speed and Violence: Why Scientists Fear Tipping Points in Climate Change,* Beacon Press, Boston, 2007, Brown, Paul, and Leipold, Gerd *Global Warning: The Last Chance for Change,* Reader's Digest, Pleasantville

what they objectively believe is necessary to prevent dangerous climate change. For the activist groups, they are setting goals to spur people to action. Either way, the more ambitious claims are that we will need to **reduce our carbon output by 80% by 2050 to prevent dangerous change.** Given the evidence of accumulating carbon and methane in the atmosphere in the last couple of years – possibly from the thawing tundra – even the 80% goal may be too modest. Change of that magnitude appears extremely ambitious if we assume we are going to continue our individualistic, consumeristic habits.

Currently, not only is the level of carbon growing in our atmosphere, but **the rate of increase has accelerated in the last ten years as well.** This is truly disturbing news. Not only are we facing a serious problem, but the rate at which the problem is getting worse is accelerating by the year.

How Do You Reduce Your Carbon Output by 80%?

To see how to reduce your carbon output by 80%, it is useful to look at what ordinary people are already doing. Such important information gets lost in the national and global statistics. To that end, I conducted a small survey among people I know, many of whom are very personally concerned about environmental issues. I asked them to give me their household energy bills, and a general description of energy use in their household. The results are terribly interesting.

A few caveats about my survey are as follows. Obviously, this survey is very small and not "scientific" in any statistical sense. It is not intended to be. It is rather intended to be a description of what a few people are doing to contribute to environmental protection, and the results of their actions. The survey looked only at household energy use, not transportation, commercial, or industrial energy use. The survey looked at energy, as measured in kilowatt hours, cubic feet of natural gas or gallons of propane. These units were all converted to BTUs. The survey looked at energy use, not carbon output per se. Obviously, there is a close relationship between the two, but they are not exactly equal. The point is to compare the different conservation strategies of a few ordinary people to get a glimpse of what is possible. Most of these cases have been anonymized.

NY, 2007

How does conservation work in the real world? Let's see.

I. The Base Case, American Average

In the average American household, each person uses about 38,966,000 BTUs per person per year. This includes all energy used in the home, but excludes energy used outside of the home. This number is based on the average household size, so it includes children. These numbers are based on information from the Energy Information Administration, the section of the Department of Energy that is responsible for compiling and making available statistics about energy use and predictions.

II. The Jones Household

The Jones Household consists of two adults and three children, two of which are teenage girls. They live in house built in the 1930s and renovated in 1990s. The house has a gas boiler and radiators for heat. The Jones family is very concerned about environmental issues, and tries to limit their energy usage. They keep the thermostat set at moderate temperature settings, though the boiler is old and does not have fine-tuned controls. The house also has air conditioning, though they try to run it as little as possible. The Jones family has replaced their light bulbs with compact fluorescents. They run a dehumidifier in their storage area. They also have a clothes dryer. The electric bill has dropped considerably since their teenage daughters went to school and the family is no longer using the dryer. Mr. Jones is an environmental activist who works diligently on a number of conservation, transportation, and alternative fuels issues. The average household BTU consumption for the Jones household for 2006 and 2007 was **10% above the American average BTU consumption.**

III. The Johnson Household

The Johnson Household consist of two adults living in a home. They have gas heat, and a washer and dryer. They have a programmable thermostat, and most of their lighting is done with compact fluorescent light bulbs. The Jones are concerned about energy use and try to conserve energy. Energy consumption in the **Johnson Household for 2007 was 51% higher on a per-capita basis than the American average.**

IV. The Smith Household

The Smith Household consist of two adults and two small children. They have gas heat and a gas water heater. They turn off the pilot to their boiler in the summer months. They have programmable thermostats that they keep set at very moderate temperatures. They have a few window unit air conditioners, but they only use them at night. They have insulating drapes, and have added insulation to their attic and crawl space. They have added storm doors and windows, and use compact fluorescents for most of their lighting. They dry their clothes on a clothesline most of the time, but use a drier occasionally. They purchased a new higher-efficiency refrigerator and dishwasher. Energy consumption in the Smith household, averaged for the years 2006 and 2007 was **15% below the American Average.**

V. The Randolph Household

The Randoph family lives in an older house that is not well insulated. The family is unusual in that they recently installed a number of energy saving devices. In the summer of 2007, they installed a solar water heating system, an on-demand water heater, and a small wood stove. (The energy content of the firewood used was included in this analysis.) They use a solar cooker and a haybox cooker intermittently. They also installed good quality, double pane windows several years ago. They use compact fluorescents. For the Randolph family from January to June 2007, prior to the installation of the solar water heater, on-demand water heater, and wood stove, their fossil fuel energy use was **3% below average on an annualized per-capita basis.** For July to December of 2007, their fossil fuel energy use was **41% below average on an annualized per-capita basis.**

VI. The Rogers Family

The Rogers family are dedicated environmental activists. They live in an old house that is poorly insulated. They have gas heat. They keep the thermostat set at very moderate temperatures during the day, and set it back at night. They have an air conditioner, but use it only moderately during the day in the summer. The Rogers family electricity use is very modest, below average. But the gas used to heat their older, uninsulated

home adds up. Overall, their average per-capita energy use was **41% above the national average for 2006-2007.**

VII Twin Oaks Community

This case is not anonymous, and not average by any measure. Twin Oaks is the largest, secular, income sharing community in the United States. Its membership, including children, has been steady at around 100 people for a number of years. The community was founded in 1967. The community was poor in the early years, so the early construction in the community was often of poor quality. All of the residences are dormitory-style. The older ones are poorly insulated, the newer buildings are much better. People who live at Twin Oaks mostly work in the community's businesses, which include hammock making, food production, and other businesses. Most of the people at Twin Oaks work, eat, and engage in recreational activities at the community most of the time, though some members do occasionally eat out, or go to see movies, etc. This radically reduces transportation costs, and Twin Oaks has no private cars, but does have a small fleet of shared vehicles.

Twin Oaks presents a particular difficulty in comparing residential energy use to the rest of the U.S. because residential, commercial, and industrial uses are inseparable at Twin Oaks. Even recreation would often be counted under “commercial” energy use when the average American family goes to a restaurant. To address this difficulty, I did several different analyses. The results ranged from **63% to 82% less than the American average.** One can surmise that a fair number would suggest that people at Twin Oaks use about three quarters less household energy per capita than the American average.

VIII The Fletcher Cooperative

This case looks at an urban cooperative. The house that these cooperative members live in is an old house that was rebuilt as a strawbale house. It has active solar heating, and uses high-efficiency gas for back-up heat. The house also has a high-efficiency gas water heater. The house uses compact fluorescents for lighting. The house has a washer, but uses only a clothesline and indoor clothes “horses” to dry clothing. The house uses insulating curtains on its double pane windows. The house was built with reclaimed and recycled materials to a large degree at a cost of about

$13,000 per resident, including the purchase of the original property and upgrades. The house does not have solar electricity. The per capita residential energy use in this house is **91% less than the average American residential usage.**

Why do so many environmental activists use more energy than average Americans?

This small survey looked at a number of households and compared their at-home energy use to the American average. Surprisingly, **many of the homes surveyed came out well above average.** Keep in mind, these are environmentally concerned people, not average consumers. How could that be that their energy use was so high?

A number of the houses surveyed were older and not well insulated. Also, all of the houses in this survey, other than the cooperatives, are single family houses. The American averages standard (Case I) includes all manner of households, from urban apartments to rural houses. In general, city dwellers use less energy per capita than do rural or suburban Americans because apartments in the city are smaller and share walls with other apartments. (The average New Yorker, for instance, uses about half the energy of the average American because so many New Yorkers live in apartments and don't have cars.) **The energy use of a single family home – even if it is occupied by concerned individuals – is likely to be higher than average** because of this bias.

It is also clear that the goals being set by even the most radical environmental groups regarding energy conservation over the next 50 years are going to very difficult to meet for people living in single family houses, and are **already being met or exceeded by people living cooperatively.** The survey demonstrates that while a very careful, conservation oriented family can save considerable energy in a single family home, many very dedicated environmentalists fail to save a lot of energy because they are simply not willing to shiver in the cold and have not been able to, thus far at least, afford to upgrade the insulation in their home.

Cultural Resistance to Cooperative Living

Clearly, there is some resistance to cooperative living as it intersects with issues of class and power. Throughout all of human history, almost all of humanity has lived in some form of cooperative arrangement. The reality is that **the poorer three-quarters of humanity often live a very frugal existence because they have no other choice.** To speak of a "community laundry" is fairly neutral. After all, laundromats are common, and commonly used by low-income persons who cannot afford their own washer in their own house. Everything about the American Dream is focused on private ownership and private control.

Humans are very acutely aware of their social position and social power. As I said, ***we do not consume so much because we are greedy. We have a consumer society that encourages wastefulness because that indulgence maximizes our economic and military power.*** That is why Americans are so individualistic. But that individualism and hyper-consumptive behavior are going to change, whether we like it or not.

Social Movements

Social change movements always start at the fringe. The young, the crazy, the marginal, the radical will try new things that older, wealthier, more powerful people will not. Social movements always start among a dedicated minority which is alternately ignored, ridiculed and suppressed, until finally they win. And we cannot expect the most privileged to give up that privilege until and unless they have to. The same will be true of the global environmental movement as has been of every other movement.

The peaking of global oil supplies may be the first trigger, the first of the large, irreconcilable limits that we face. Or perhaps economic instability – triggered as it is by oil price oscillations – will not be resolved.[1] But even if oil production has not peaked, even if short-term economic growth returns, we are facing many limits. Economic growth cannot and will not continue in its current form for decades to come. The Earth simply is not that large. Mainstream economics is in denial that we live on a finite Earth. Sadly, **almost every word every western citizen hears**

1 Rubin, Jeff and Peter Buchanan *What's the Real Cause of the Global Recession?*, CIBC World Markets, StregEcon, October 31, 2008

on the news every day is in denial of the limits of growth.

The laws of physics do not care about our mis-judgments. Our lifestyle is going to change in the coming years. Either it will change because escalating commodity prices cause a polarization of wealthy and poor, and a decline of democracy, or we reduce our resource use faster than we have to. We are going to change. We can only lead or follow. Unimaginable things are going to happen. We either create the unimaginable world we want, or we will have the unimaginable world we don't want forced upon us. **The difference between Heaven and Hell on Earth is whether we lead the curve or follow the curve.**

Chapter Six: Implementation; Five Easy Steps Guaranteed to Save the Earth

As an activist, there are a few conversations I have with people over and over again. One of those conversations goes something like "they will never go for it.... People are so caught up in their own lives, they are not ready for change." That's an emotional response to feeling overwhelmed by the scale of the task we need to undertake and an understandable reaction. The reality is that **our economy, and our culture, are going to change dramatically in your lifetime whether you like it or not.** The world of economic growth, of cars and airplanes and climate controlled houses is going to change enormously in the decades to come. That is a given. **We can only lead history or be led by it.**

We need not wait for everyone to agree that dramatic change is necessary. **Every social movement starts as a minority, a small number of people.** Even the most powerful movements in history started that way, with a few marginalized people advocating changes to which the vast majority did not pay any attention at first. Every society changes over time, and those changes always start at the margins. We are entering into an age of accelerated change. We will live more sustainably, whether we like it or not. The only questions are whether we will live under eco-fascism or eco-democracy, and how much of wild nature will be left intact.

It's About You, Not the Great Men of History

As children, many of us were told that the founding fathers of politics, the wise men of science, created the world that we live in. It just isn't true. **You do not have the right to free speech because someone wrote it on a piece of paper.** You have that right because anarchists, youth, bohemians, suffragists, abolitionists and communists marched in the street, insisted on their right to speak, and were often abused in defending those rights. The electronic media and the internet have linked us to the rest of the world, only to convince us of our smallness within it.

Instead of saying what people want to hear, it is time we spoke the truth. Instead of buying into the lies that "smart growth," "natural capitalism," or improving the efficiency of the consumer society can save us from the coming age of environmental decline, we need to be

clear that structural changes in our society are needed. The efficient high-consumption society will destroy most of what is left of wild nature, and most of the people currently alive on the Earth if we let it run its course.

To be part of an effective social movement, we need to build a networks of people who serve as support for each other and as support for the growing movement as well. Find people who share your concerns. Don't wait for your viewpoint to show up on the evening news. Don't expect to change the world on the internet or via email. Those are tools, like hammers and nails, you can build things with them. But the tools themselves are not a movement. They lie on the ground until you pick them up and use them. **Every effective social movement is based on social networks, interconnected groups of people who incur mutual obligations and who aspire to a higher purpose.** The internet does at least as much to destroy social movements as to build them because it isolates and separates us as much as it connects us. Use the tools, but don't let your fear of taking risks cause you to hide behind them.

Do you want to really create a sustainable culture? It is both terribly easy and very difficult. The changes themselves are easy. The social pressure to avoid the change is the only thing that makes them difficult.

Five Easy Steps to Making Real Change

1) **Give up your personal car, or do not get one.** Biofuels will only make the crisis worse. You will not be hungry or alone. In fact, your life will be improved once you have navigated the transition. The automobile is not only the most environmentally destructive machine ever created, it is also the most destructive of human social networks. The automobile separates you from your immediate environment, the people around you. As you drive by people on the street, you cannot talk to them, know their needs or their willingness to know you. As a result of the automobile, social networks get spread over many miles. This makes connection more tenuous, less reliable. Living a life without the car will not make your life more difficult, it will make your life more fulfilling by transforming your relationships to the world and people around you. You will be more connected to the people and the environment around you. You will develop a sense of connection, safety, and empowerment as you are more strongly and clearly rooted in the local community. If you face inconvenience and difficulty getting where you must go to buy food,

work and play, then you can join the movement for usable mass transit instead of giving your support every day to the oil companies and subsidized roadway system that is destroying humanity, the natural world, and your connections to the people nearest to you.

2) **Don't ever get on an airplane again.** They are intrinsically unsustainable. These days one hears debates about flying, about how much inconvenience one should be expected to endure in order to undertake that most abstract of tasks, that of creating a sustainable culture. The argument is absurd, borne of the bizarre mythology of our individualized, consumer age. If you and I were on a big ship – one named the Titanic, perhaps – and someone ran up onto deck and told us that they think the ship might be sinking, what should we do? Whatever we do, personal inconvenience and embarrassment would not be of great importance because of the gravity of the situation. Given that personal inconvenience is often raised as a limit to our response to the current environmental crisis, what does that tell us about how seriously we are trying to address the problem?

Our cultural norms can compel us to such bizarre and irrational behavior, to ignore threats to our well-being. The rational response is to figure out how serious the threat might be, and if it is serious, to set any thought of personal convenience aside and respond to the threat with all due haste. (In a collective fashion, one would hope.) How serious is the threat currently facing the global climate? Enormous uncertainties remain, but there is a substantial possibility that we are near, or perhaps even beyond, pushing the global climate system to a "tipping point," a point where positive feedback loops (carbon and methane from the thawing tundra, as well as from the oceans) push the Earth into a very different climactic regime. Given the potentially catastrophic nature of that threat, it is bizarre that we are discussing personal convenience. **There is a significant chance the ship really is sinking.** That demands a new way of thinking. If we can make that mental shift quickly enough, we can accomplish extraordinary things. If we cannot, then we will continue to play Russian Roulette with all of creation, all the living forest, all of the wild creatures that live there, and *every* generation of humans that will follow us. The people on the Titanic had a hard time understanding their dramatically changed circumstance until it was too late. The time for change is now.

3) **Live cooperatively.** Many people are drawn to the idea that technology and new energy sources can save us. In trying to find ways to live more lightly in their homes, many people want to know about solar, green building, and the newest high-efficiency gizmos. As long as we are applying these technologies to single family houses, the returns are going to be limited at best.

Most of humanity has lived in cooperative societies for all of human history, including present times. It is rather extraordinary that a relatively small number of people would develop a highly individualized and extremely consumptive lifestyle and then imagine that such is the only way to live. **Your grandchildren will live cooperatively.** The only questions is whether they do so in a degraded and degrading environment, or in a humane and sustainable circumstance. The difference will be based on our decisions.

4) **Eat local, eat organic, eat low on the food chain.** Did you know that the U.S. imports almost the same amount of food we export?[1] Did you know that the food on your dinner plate today, according to various estimates, traveled an average of 1,000 to over 3,000 miles, and contains ingredients from five other countries?[2] In the latter part of the twentieth century, food trade grew more than twice as fast as populations or food production.[3] All of this increase in trade and the transportation of food has been financed with cheap fossil fuel. Now that we are entering the post peak-oil age, that trade will decline. If we start rebuilding local agriculture, then that transition can be a positive one.

While you may be drawn to organic food for health reasons, the best course of action on a larger scale gets to be a complicated question. What if the big diesel tractors of industrial agriculture come to a halt as we run short of oil? Organic agriculture, particularly if it is practiced on a large scale, may in some cases use more diesel for tractors than conventional agriculture (because organic farmers do more mechanical cultivating and less spraying of herbicides). The largest energy input into industrial

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1 Grist Magazine, February 10, 2006, also see US Department of Agriculture Research Service, http://www.ers.usda.gov/Data/FATUS/monthlysummary.htm
2 Pfeiffer, Dale Allen, *Eating Fossil Fuels: Oil, Food and the Coming Crisis in Agriculture,* New Society Publishers, 2006, p.24-25
3 Pfeiffer, ibid, p. 24-25

farming, however, is not diesel for tractors, but natural gas for fertilizer.[1] Organic farmers build the soil with nitrogen-fixing plants and other processes, not chemical fertilizer. Because organic farmers do not use chemical fertilizers, some studies indicate that they use less overall energy. However, plausible arguments have been made that, given the extraordinary growth in human population, we will need chemical fertilizers for decades to come to feed the world population. The other side of the coin is that numerous studies have shown, for farms all over the world, that small and organic farms are more productive per acre, but less productive per person-hour of labor input. As energy gets more expensive, and thus labor becomes cheaper in relative terms, that will favor small and organic farms.

Good soil on an organic farm is durable and produces high yields year after year. On conventional farms, the soil is often depleted, serving only as a sponge that absorbs chemical inputs. Chemical industrial agriculture can at best delay the day of reckoning when we have to feed ourselves with a steady-state economy. The more we build our soil using organic methods, the better off we will be in the long run. In all honesty, there are no simple answers. Feeding the global population in the near term without chemical fertilizers would be all but impossible. Having said that, with organic agriculture, we are putting money in the bank. With conventional agriculture, we are taking money out. The wise course seems to be to build the "bank account" – build our soil – as much as we possibly can here and now.

As I mentioned earlier, the Food and Agriculture Organization has estimated that industrial animal agriculture contributes more to climate change than does the entire transportation sector.[2] Humans are capturing as much nitrogen for fertilizer as all of the plants on the Earth at this point.[3] The nitrogen oxide that results from the application of fertilizer is a powerful greenhouse gas. As much as people do not like being told what to eat, the American diet that is centered on animal foods, and food shipped from around the world, is very environmentally destructive. If

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1 Pfeiffer, Dale Allen, *Eating Fossil Fuels: Oil, Food and the Coming Crisis in Agriculture,* New Society Publishers, 2006, p.8

2 *Livestock's Long Shadow, Environmental Issues and Options,* UN FAO, released November 2006

3 Heinberg, Richard, *The Party's Over: Oil, War, and the Fate of Industrial Societies*, New Society Publishers, Gabriola Island BC, 2005, p.66

everyone in the world ate the average American diet, the Earth could sustain only 2.5 billion people. And yet it could sustain 10 billion eating the average Indian diet.[1] The difference is that most Indians eat primarily a grain-based diet. To prevent escalating environmental destruction and violent social polarization, it is critical that we embrace a local, mostly plant-based diet and espouse its importance.

5) **Take action, NOW.** A catastrophic epidemic virus of complacency has been released upon the American public. The U.S. is the military defender of the transnational corporate economy. Enough of the U.S. voting population is in a position of ownership that they are vested in the status quo. The political complacency has trickled down. The youth of America are being numbed into ignoring the extraordinary threat to their future so their parents can enjoy their consumptive old age.

It is time you defy complacency. Not just on the internet. In your every action. You cannot learn how to be politically effective from a website or even a book. There are no schools that teach it. The only way to learn how to be effective is to do it. Get involved.

Use your bike, use buses and trains instead of cars and planes, change your diet, find a group of people with whom you can live cooperatively. Fight for a more democratic and just economic and political order. Your actions matter, so act as if they do!

There is no wrong tactic other than disengagement. If you get involved in advocating the wrong position in a frustrating arena of local politics, the world will be better served than if you stay home. There is no such thing as bad activism. Pass a local bill. Get involved in state politics. Chain yourself to something. Get arrested.

If you continue the current course of complacency, of having no personal commitment to any cause, then you will not long live in a democratic society. In the transitional moments of history, people of great courage and wisdom have endured sacrifice and made personal commitments to the higher purposes that bought us our comfort and freedom. And now we face the greatest transition our species has ever faced, the greatest set of challenges and opportunities. Don't act as if personal moral

1 Brown, Lester, *Plan B 2.0: Rescuing a Planet Under Stress and a Civilization in Trouble,* Norton, NY NY, 2006, p.177

commitment is no longer necessary, even as the global market economy is about to murder most of humanity, even as every other living creature on the face of the Earth is tossed into the furnace. Don't sit comfortably under the compact fluorescent glow imagining that no great commitment or sacrifice is necessary. In the past, when people rose up to demand their freedoms, they did not do so all at once. Organizers of the past had to face embarrassment, had to face being the odd one out when others were not ready. Both Heaven and Hell lie at our doorstep. Our commitment to get involved will determine which is our future.

To talk about sacrifice and commitment can feel overwhelming, especially if you already feel stretched thin by your existing responsibilities. The consumeristic lifestyle is a treadmill. You feel like you have to keep running or you will fall, but once you jump, you are rewarded with great benefits. These benefits include:

– Reducing your transportation costs. Cars and planes are expensive! Without even recognizing it, you may be driving to work so you can afford to drive. It may take some time and thought, or even a move to a new location, to figure out how to live without cars and planes. But once you make that transition, you will need far less money. You will have much more control over your time.
– Increasing your health, reducing your health care costs by exercising and eating better. Many of the diseases and ailments that most Americans assume are unavoidable or "natural" can be eliminated by a lifestyle that is healthier for you and your world.
– Increase your security because you live cooperatively. The health care or financial problems that wreck the lives of ordinary individuals are much easier to endure when you are supported by your community and your family.
– A greater sense of connection and solidarity because you will build relationships with people who are acting on similar values and commitments.
– Greater meaning and purpose in your life because your actions are based on something larger than yourself.

Some Comments on "How"

1) Ditching the Car.

The most important decision you can make is to live in such a manner that you can get to work without a car. Cars shred the fabric of our society. They also make you powerful, but that power is no more than a gun pointed at your own head at this point. I have lived without a car almost all of my life. It's not hard. You simply make a decision that it is important. The rest falls into place. If you live in a city with transit, with sidewalks and with bike-accessible services, it's fairly simple. If you want to live in the country, then you need to cooperate with other folks for your transportation. The single family home reliant on the private automobile is unsustainable. If we turn to biofuel to run our cars, we will cut down every tree and bush you can see in order to fuel that lifestyle as oil runs short in the coming decades. It has been done in the past.

Take a few rides on your local transit system to get a feel for it. Get a good bike. As regards rain, cold and snow, Americans are taught to be afraid of the elements so people can sell us things to protect us from that manufactured fear. The truth is that you will be more comfortable more of the time if you push yourself a bit. At the change of each season, get out in the first cold or hot day. Your body has biological mechanisms by which it adjusts to seasonal changes. You need to tell it to do so. You will expand the breadth of temperature at which you are comfortable.

Biking and walking in bad weather is far more fun than driving. Driving in bad weather, the rain and cold is like a demon taunting you from the outside, obstructing your vision and making you worry about what would happen if you had to face it without your car. Once you are out in the elements, the demon is gone and you are free to roam and laugh at those who fear the elements. If you live in a cooler climate, get a good rain suit, good gloves, ear protection and decent shoes. Walking and biking even in severe temperatures is easy, if you protect your extremities. Your body will generate enough heat to keep you warm, but you need to take care of those fingers! I have biked dozens of miles in a single day in single digit temperatures. It's not hard, but you must have good protection for your fingers, ears and toes.

Take a bike safety class and learn how to deal with traffic. The League of American Bicyclists, as well as other groups, sponsor classes.[1] If you are new to cycling, beware that new cyclists are more likely to get into accidents with cars than experienced cyclists. Cycling is less dangerous

1 http://www.bikeleague.org/

than driving, or many other things we do.[1] Biking is, for instance, statistically safer than driving a car, swimming, or snowmobiling. Practice and training can help improve your safety.

Using your body to walk and bike will improve your diet. Your body will tell you to eat better because it needs the energy and nutrients. Listen to it. I have known a number of people who have cured addictions and other health problems with long distance bike touring. Once you demand that your body perform, you have to eat well and focus on what is important. Your health will improve.

We are going to have to live without personal cars. What will be the impact of living without a car? By ditching your car, you will not only dramatically reduce your carbon output, you will also make a visible statement. If you make changes in your house to use energy more efficiently, only people who come in your house will notice. When you get rid of your car, everyone you come into contact with will notice. Try avoiding your car for a week, or a month. You will reorient your life to non-car travel and your friends, family, acquaintances, and even strangers will notice. You will be the change you wish to see, and you will be seen and admired!

2) Not Using Airplanes

I'm really unhappy just now. I want to go to the moon! It is such a terrible inconvenience! Such an awful imposition on my interstellar consciousness, my traveling life! And Mars, I want to visit Mars! It is an unjust imposition on my personal freedom that I cannot travel to Mars!

Have you ever heard such a conversation? I should hope not. Expectation matters quite a lot. As much as spreading ourselves over the continents of the Earth may seem to bring us together, it is really tearing us apart. There are many people, animals and plants that live very close to where you live who desperately need your attention. When you take that attention far away, you only lose sight of what is close to home. A hundred years from now, our children will live among devastation, or in a conscious culture that localizes power. A localized culture will not have famous musicians, or globe-trotting brand-name beverages, because your children will be too busy drinking in the sounds of that which lives

1 http://www.magma.ca/~ocbc/comparat.html

around them. They will communicate with, probably trade with, people from all over the world. But they will not on a whim or for personal pleasure mortgage their collective well-being to indulge the mode of consumption we call air travel.

3) Cooperative Living

Setting up cooperative living takes some time, and the personal rewards are well worth it! Living cooperatively can greatly enrich your life. Living with other people will mean more of a social life, more parties, more gardens, more meaningful relationships, and more support. You will know everything that is happening in town because someone in your house will be involved with it.

There are a few different ways to set up cooperatives. You can rent a house, and then invite other folks to move in with you. Generally, such groups want to use some form of consensus, but don't get caught in the trap of "consensus equals the right to block a decision." That's not consensus, that's surrendering group power to a single individual. Consensus brings together the best thinking of the whole group. It represents the needs and wisdom of the whole group in reaching toward some higher goal. If a person does not agree with the direction of the group, then that disagreement must be defined in terms of the higher goal of the group. Everyone should be given time to be heard, but be aware that sometimes personal distress will surface in a meeting and it may be more effective to deal with that distress outside of the meeting. There is no simple rule for how much to allow personal material to enter the group processes, but there is a balance. If an individual insists on putting their distress before the needs of the group, then it is entirely appropriate for a consensus group to go around them. Formal training in consensus and conflict resolution can also be helpful.[1]

If you own a house, you can invite people to live with you and charge them rent. Being a landlord can be a mixed bag, but it beats living alone in every way. Try not to be too controlling, or at least be clear with your

1 *A Manual for Group Facilitators,* Center for Conflict Resolution, Re-published by the Fellowship for Intentional Community, ISBN: 0-9718264-0-4, see ic.org, *Building United Judgment: A Handbook for Consensus Decision Making,* edited by Center for Conflict Resolution, ISBN: 0-9602714-6-5, see ic.org. See also the Center for Conflict Resolution, http://www.ccrchicago.org/

housemates and tenants regarding what you are attached to and what not. If you have a house of which you cherish every detail, sell it. Buy a house to which are are less attached and proceed to invite people in. Don't be owned by your possessions. Making a difference in the world is far more important, and far more enjoyable!

Charge your tenants a flat rate for all utilities. This puts you in the position of being highly motivated to invest in energy saving devices (like solar hot water and what not) because the more you save, the more you make. You can share income, share expenses, or both. A very simple expense sharing system involves keeping a spreadsheet on a computer so that each person gets credit for what they buy for the house. Each person has a running account. Each time they buy food, for instance, they can turn in a receipt and the house accountant can give them credit on the spreadsheet. Beware that many cities have cohabitation laws that are supposed to prevent people from living together. Proceed as you see fit.

If you don't want to rent or be a landlord, get together with some other folks and buy a house together. You will probably need to set up a corporation of some sort. Nasty word, but a simple structure that will allow you to share economic ownership. Banks will not loan money to a random group of people, so you will need the corporate legal status. It varies by state, but often setting up a non-profit corporation (not an IRS 501-c-3 nonprofit) is really easy, cheap and fast. It takes about five minutes to get an employee identification number online from the IRS, which will allow you to open an bank account in the group's name. Alternately, one person can own the house and the others can buy them out over time. You have to have strong enough relationships that you can trust that circumstance. There is quite a body of wise literature about how to set up cooperative structures. A most excellent resource is the Intentional Communities Directory.[1] The same directory is at ic.org (which stands for Intentional Community "dot org") and directory.ic.org

Last but not least, there are numerous intentional communities already in existence. Hundreds in fact are listed at directory.ic.org. Consider joining one. Some groups are secular, some are religious. Some are environmentally minded, some are simply subdivisions that call themselves "communities." Beware that what people say about

1 *Communities Directory 2007*, Fellowship for Intentional Community, Rutledge, Missouri, USA 2007, ISBN-13: 978-0-9718264-3-4

themselves and what they really do are not always congruent. There are numerous groups who are living far more lightly than the environmentally minded folks who try to do so in their own house in the mainstream.

The social life of community can be enormously rewarding. **Almost all of humanity has lived in some form of communal setting for almost all of human history.** Your grandchildren will live more cooperatively whether you like the idea or not. The only question is how much damage we do in the meantime.

The largest obstacles to cooperative living in the U.S. are embarrassment, the desire for control and privacy, and the desire to accumulate capital. The embarrassment factor relates to what symbolizes adult "success" in the U.S. While it is considered acceptable for youth or college students to live cooperatively, it is looked upon with less favor for adults to do so. Take a deep breath and consider that the survival of your children and the living Earth is more important than your embarrassment. On a more practical level, find friends who embrace your choices.

You might find it challenging to live in circumstances where you do not have the level of control and privacy to which you are accustomed. Find people who are compatible with your desires for cleanliness (or the lack thereof). Trade your control for deeper relationships. Your culture has taught you to get all of your support from a romantic partner or spouse. Deepen your relationships with others, and open yourself up to those relationships. Is that important for a real environmental movement? I would say so. Remember those farmers tromping about in the late 1800s, with no telephones, no internet, no email, not even a postal service? They lived in small towns, in places where people met and talked face to face. They knew each other personally. They created by far the most powerful progressive movement this country has ever known. Organized social networks based on real relationships are more powerful than money, politics, or the internet.

As regards the accumulation of capital, most Americans use their home as not only a place to live, but as an investment. Ideological discussions about ownership and accumulation aside, that investment strategy still works if you rent out rooms. If you are going to cooperatively own a

house, you may need other investment strategies.

As an ideological aside, for ordinary people to have control over their own "means of production" has been espoused by almost every populist movement over the ages, from the early Christians to the early capitalists. As sacriligious as it may sound, the real intent of capitalism as espoused by Adam Smith and of the early communists were very similar – the holding of money and power in the hands of ordinary people. That is what is important. But you do have to have the wisdom to use your resources wisely, and invest them with some consideration for the world in which your grandchildren will live.

4) Eating Locally, Eating Lower on the Food Chain

Local food is a rapidly growing movement in the U.S., and in Europe as well. The "slow food" movement in Europe started as an alternative to the growth and proliferation of fast food chains. The number of farmers markets and CSAs (Community Supported Agriculture where customers buy shares in a farmer's production) are growing rapidly across the U.S. If you haven't noticed a CSA in your area, look around. Chances are high that there is one. Local food has also become a rallying point for many people who hold a broad range of environmental concerns. Food cuts across many traditional conservative/liberal lines. Many cities, towns, and rural areas in the U.S. have new or growing organizations that promote locally grown food.

The issue of vegetarianism can get more complicated, and personal. As I look at the environmental situation we are facing, it is clear that serious and committed action is necessary. Many people argue in favor of locally grown meat, or grass-fed meats. Any such approach is an improvement over the current factory farming methods, both from environmental and ethical perspectives. But cattle are also the largest source of methane in the U.S., methane being far more powerful than carbon dioxide as a greenhouse gas.[1] That factor alone argues against widespread cattle grazing. The bottom line is that food chains concentrate energy as you move up the food chain. That is a matter of physics, and cannot be changed. It is also at the root of the issue, and is the basis of

1 http://www.epa.gov/methane/sources.html Note, one has to add "enteric fermentation" and "manure management" to get the total methane generated by cattle.

aforementioned comments regarding how many Indians versus Americans the Earth can support.

At the end of the day, writers seem to defend their own personal choices with whatever science they can find. Some animal rights advocates try to minimize the role of meat and animal foods in human evolution. The truth is humans have always been omnivores. But wild rabbits run much faster than wild carrots, so nuts, fruits, tubers, and grains have always been the base of our diet, and the majority of our diet. In a world that is increasingly crowded and strained, a local, mostly plant-based diet is very important.

It is clear that vegetarianism, or at least a very low animal-product diet, is both healthy and reduces your footprint on the Earth. If you are interested in moving your diet in that direction, there are a few things you should be aware of. A considerable fraction of your body weight is made up of the symbiotic organisms that live in your intestines and digest your food in cooperation with the rest of your body. You carry inside of you an ecosystem that is adapted to extracting energy and nutrients from what you eat. The ecosystem that lives in your digestive tract can adapt to a wide variety of inputs, but in general it is more suited to digesting plant material. If you are accustomed to eating a diet rich in animal foods, you will need some time to reorganize the symbiotic ecosystem in your digestive tract. Different kinds of enzymes and microbes are needed to extract nutrients from a plant-based diet than from an animal-based diet. Your body will adjust on its own over time, but beware that it is both a biological and mental process. And just because a diet is vegetarian does not make it healthy. A varied diet minimizing highly refined food is important. Remember, everything in moderation, including moderation!

5) Getting Involved

Do it. There is no school. If you find a mentor, that would be rare. If you have a clear sense of direction, a lack of doubt, or fail to make a lot of mistakes, that would be even more rare. Only experience can teach you what you need to know.

If you don't want to start a new project on your own, volunteer for a local organization. Do not be inhibited by the purity of the mission of the

organization you are helping. Get involved and learn what you can. Find other people who you can talk to about your concerns. Support is immeasurably important. Take on small projects at first, little battles that you can win. Build on your successes, both personally and organizationally. Make a public commitment to encourage yourself to follow through. And be forgiving, of yourself as you would of others. Change takes time. If you are making important changes, doing things differently, it will inevitably be difficult at times. A wise activist is both fully committed and infinitely forgiving of themselves, impatient enough to want change now, and persistent enough to get it.

The Second Great Leap

You face a transition of historic proportions. Anthropologists have referred to the transition that occurred as humans evolved to be highly cultural beings as the first "Great Leap." As a result of the the first Great Leap, our evolution was accelerated from the slow pace of multi-generational biological change to cultural change, mental adaptation.

But our cultural adaptation is not conscious. It is difficult for most people to conceive that our society systemically suppresses social awareness. It has been, in an odd way, beneficial for us to be so unaware. **Conscious cultural evolution would represent a second "Great Leap,"** from the modern centralized societies that suppress the awareness of their citizens to societies that systematically maximize the awareness of their citizens and thereby consciously choose their future. It is likely that our gathering ancestors did indeed limit their growth on purpose, with some knowledge of the consequences of failing to do so. But now there are many more of us, and conscious cultural change has never been done before on a large scale. It is a transition of monumental, historical proportions.

Our current predicament has been created by the last several thousand years of human groups responding to stress. Some ten thousand years ago, as human populations grew, our ancestors abandoned gathering and started farming. From there, stratified chiefdoms and states arose. These stratified societies arose not simply as a response to storeable grain that "allowed" an elite class to develop. Rather, social stratification evolved then precisely as it evolves now, through a series of stress-response processes. Stratified societies have a higher organizational capacity. They are able to organize people on a mass scale more quickly, more

effectively, to accomplish onerous tasks. The great conundrum of our species is that the very means that increases our organizational capacity decreases our cultural consciousness.

The Long View

Prior to the rise of stratified societies, slavery, mass warfare, and harsh forms of male supremacy did not exist on the face of the Earth. With the wealth extracted from colonialism, some early states became somewhat democratic. And now, in modern times, wealthy westerners have experienced a similar revival of democracy. You have an incredible abundance surrounding you, provided by the Earth, provided by our own inventions. The stress-response process is still very much the driver of our non-conscious culture, but it need not be so. We have an abundance much greater than that which propelled the democratic transformation of the early Greeks or Romans.

We are caught in a collective hypnosis that keeps us bound to an archaic scarcity. Our political leaders maintain our allegiance through fear, through maintaining the illusion of scarcity. **But if we as citizens could find the means to re-allocate the abundance that is in our possession, then we could create the fertile ground on which democracy would thrive.**

The prosperity of past colonial victors (at the expense of the colonized) spawned their democratic development. Now we are facing a decline into territory that is still, generally speaking, far more prosperous than our ancient kindred could ever have imagined. The current preponderance of evidence is that we are at or very near a peak in global oil production. Even as oil production declines, we still have an extraordinary volume of energy at our disposal compared to our ancestors. We do not have an energy shortage. We use energy and resources at an incredible rate. If we found a new, bountiful energy source, our non-conscious culture would use that energy ever more quickly to power hyper-consumption, to continue bulldozing what is left of the natural world. Climate change, species extinction, the loss of topsoil – all of the other limits we face would only be made worse. **We need the means to make new choices, not new sources of energy.**

There are many small, clean technologies that can be beneficial. But we

do not have an energy problem, and we do not need new technologies to solve the problems that we have. It is terribly difficult for people to understand that. **We need to create a conscious culture that can choose its own economy. Nothing else will solve the problem.**

Do not wait for some compelling movement to come and sweep us in a new direction. We don't need new energy, or new technologies. All we need is to become who we think we already are – people who organize their personal and social lives based on the information they have. We have been taught to look upward, to charismatic leaders, movie stars, and politicians to give us direction. If we simply took what we already know and applied it to the real world in which we live, in coordinated action with our friends and neighbors, the great catastrophe we are facing would be turned around in our lifetimes.

Book Two: Understanding the Big Picture

Chapter Seven: Why Are We So Greedy Anyway?

We know the Earth is finite, and yet our entire economic system, our entire cosmology, is predicated on open-ended growth. Most environmentalists assume that "human nature" causes us to be greedy, selfish, and consumptive. We assume that humans are inexorably prone to excessive reproduction of our numbers. These assumptions are wrong. Our assumption and myths about "human nature" are personally disempowering and an obstacle to wise, tactical political change.

As bizarre as it may seem in this age of science, we have no science of culture, no systematic means of understanding ourselves outside of our own story, our own cultural mythology. **Most of the environmental difficulties that beset us, including climate change, are *not* difficult to solve from a technological perspective.** We have had conserving technologies available to use since time immemorial. But we are choosing to not use the technologies and skills we already have. We have a problem with how we are organized, with our politics, economy, and culture. This problem will not go away, regardless of upturns and downturns in our fortune, until we solve it.

An odd conspiracy of events has unfolded over the course of human history to deprive us of a real understanding of our relationship to the Earth on which we live. **For thousands of years, every leader of every stripe has tried to convince their constituency that their ideas, policies and morals have the power to direct the course of social change. Not coincidentally, this assumption that we guide history with our conscious intent has come to be embedded in our politics, our social science, and our moral and spiritual belief systems. It is wrong.**

We tend to think of our minds as being somehow separate from matter. We tend to think that our culture and our politics are driven by our thoughts, our attitudes, beliefs, and desires, not by dirty and unseen forces of nature. The essential core of our cosmology puts us above such influence.

It is in the interests of all leaders, whether they be political, academic,

religious, conservative, liberal, or radical, to try to convince you of the importance of their ideas. Whether they are advocating for a political cause, or trying to get your vote, or trying to convince you to support an academic subject of interest to them, it generally doesn't pay to talk about the deep, dark, long-term forces of ecological and economic change that underpin our society. It works better for them to talk about ideas, about the history of ideas, about current political debates. That is how they make ***their*** ideas seem important.

The result of the actions of countless people trying to make themselves and their thoughts seem important is an unconscious conspiracy. We have become utterly convinced of the importance of ideas, inventions, attitudes, ethics. Across the political spectrum, there is an unquestioned assumption that to change something about how our society works, you have to change how people think. The opposite is far closer to the truth.

The Dominance of Ecology and Economy

There is no simple, linear relationship between ecology, economy, politics and spirituality, but in general, **ecology sets the stage for economy, and economy dominates the development of political movements, ethical and religious attitudes over time.** We are not naively unaware of such relationships. The knowledge of the relationship between our economy and our politics and religion is actively and aggressively suppressed in the political forum and in academia.

In place of a real understanding of human culture, we have a cosmology, a daily political discourse, that is no less mythological than the most "primitive" of our ancestors. It is useful to understand the cornerstones of that mythology.

"Human Nature" and Population Growth

The unquestioned belief inside academic circles and among most people is that the growth of population and economy is natural. That's just what people do. The broader historical reality of our species tells a very different story.

The traditional theory of "demographic transition" is that pre-industrial peoples lived in a state of high birth rates and high death rates. As the

industrial nations developed, their death rates began to fall. As societies became more urbanized, birth rates fell as children were very expensive to raise in urban environments and did not contribute to household production as they would on a farm.

As is the case with most myths, this one is flattering to those who created it. It puts us at the pinnacle of a developmental process. There are some shocking new cross-cultural studies that shed new light on the human tendency to overpopulate. To quote from one; **"in all parts of the world there existed among primitive races, before they had been subjected to European or other outside influence, customs the primary function of which was the restriction of increase." "It is submitted that the evidence... does show customs restrictive of increase to have been so widespread, in the form either of abortion, infanticide, or prolonged abstention from intercourse, as to have been practically universal."**[1]

The study in question was a broad cross-cultural analysis conducted by Alexander Carr-Saunders – ***in 1922!*** One has to recognize that while the physical sciences are progressive, meaning each generation builds on the knowledge procured from former generations, the social sciences are not. Rather, they swing toward various perspectives based on the political and cultural pressures of each age.

Numerous other anthropologists have made similar points. The reality is that humans maintained an extremely low population growth rate for tens of thousands of years. Almost all pre-industrial pre-colonized human cultures had very strict population limiting measures, infanticide being prominent among them.

Population Growth is Intentional

What lessons may we take from that insight? In looking at the modern world, there are two circumstances we can see that create high population growth. The first is cultural chaos. Vietnam during the height of the American war and occupation had a very high birth rate. The Palestinian Territories today have a very high birth rate. This in part is what led to the self-flattering theory of demographic transition. Most of

1 Carr-Saunders, A.M., *The Population Problem, A Study in Human Evolution*, Oxford, 1922, p.483

the pre-industrial cultures studied by modern anthropologists have been in a state of chaos resulting from colonial conquest. Many have suffered from high growth rates because of that chaos, not because it is "human nature" to overpopulate.

The primary driver of modern population growth has been the desire of industrial imperial nations to grow more quickly than their rivals. We have ***chosen*** rapid population growth. This is a pattern we can see over and over again as we look at our myths. They are flattering, and they hide the real reasons for our behavior. We have chosen short-term economic and military advantage over sustainability.

The solutions to excessive population growth are well documented. Providing education and economic opportunity for women is the single most effective contraception in the world. People will usually have fewer children when the costs of children is high and the benefits are reduced. One also has to keep in mind that the average American consumes as much as hundreds (literally) of people in the poorest parts of the world. Each child in America is the equivalent of 300 or more children in the poorer areas in Africa in terms of consumption. That should teach us some humility about judging the unsustainable behavior of third world peasants.

But that simply begs the question. If the solutions to unsustainable population growth are relatively clear, why have we not implemented them? The answer comes back again to non-conscious culture. We believe that we propel history, the course of the world, with our beliefs and our conscious ideas. We ascribe information that does not fit that cosmology to immutable forces of nature (i.e. "human nature"). That keeps our cosmology comfortably intact. We have ***chosen*** rapid population growth as a means to dominate other societies. But our cosmology tells us that western democratic society is good for them, not that we are dominators. Thus our cosmology defeats obvious facts, and that which falls outside of our cosmology becomes "human nature" – immutable, unchangeable, incurable.

The drive to dominion through growth of population and economy has a powerful influence on what and how we think, but it is not openly discussed because it makes us uncomfortable. The problems we might face in the future can only be solved by gaining more control over the

process of cultural change itself.

"Human Nature" and Greed

We hold a similar misunderstanding about greed and economic growth. It has become an unquestioned assumption that "human nature" causes us to be greedy, selfish, and acquisitive. As a result, we are convinced that we have to try to teach people how to be greedy and selfish in a more sustainable manner. Thus there are an endless number of exhortations to encourage people to make their suburban homes more efficient, to get more efficient cars, to purchase "greener" products. The assumption is that people are innately inclined to consume, to live alone or with only a spouse and child, to maintain a high degree of personal control and autonomy in every conceivable way.

The reality is that most human cultures throughout most of human history have disdained selfish behavior. They have chosen to idealize humble, group-oriented behavior. It may seem far afield from our modern hyper-sophisticated society, but the studies of hunter-gatherer societies are instructive in teaching us about our own "human nature."

The Danger of Pride

Richard Lee who studied the !Kung in southern Africa told an amusing story of his time there. When it came time to leave, he wanted to give his hosts a gift. He bought a bullock from a local farmer so the !Kung could slaughter it and have a feast. The !Kung killed the animal, but when they were eating it they were complaining endlessly about how stringy and tough the animal was, what a poor quality meal it made. Lee was confused. Clearly the animal was young, fat and tender, ideal for a hunter's palate. Lee asked his friends about it, and they explained that when a hunter comes home after he has made a kill, he is supposed to be humble. The !Kung teach their youth to not brag, to not be greedy or expect special privilege, because; **"To be stingy, or farhearted, is to hoard one's goods jealously and secretively, guarding them "like a hyena." The corrective for this, in the !Kung view, is to make the hoarder "give till it hurts," that is, to make him give generously and without stint until everyone can see that he is truly cleaned out. In order to insure compliance with this cardinal rule, the !Kung browbeat each other constantly to be more generous and not to**

hoard ..." "But deplorable as they regard the fault of stinginess, the !Kung's most scathing criticisms are reserved for an even more serious shortcoming; the crime of arrogance ... A stingy person is antisocial and irksome, but an arrogant person is actually dangerous because, according to the Kung, "his pride will make him kill someone.""[1]

Thousands of human cultures have lived in every corner of the Earth under myriad different circumstances. Without wishing to overgeneralize, it is clear that most of them held attitudes about greed that were closer to the !Kung's than to ours. **Most people in most cultures throughout most of human history have lived in bands and villages that disdained selfish behavior.** This is amply documented in the extensive ethnographic record collected by modern anthropology. And we assume selfishness is "human nature"? Clearly our concept of what is natural is highly constricted by our own circumstance.

The Usefulness of Greed

The transition from gathering societies to stratified chiefdoms to nation states was an incremental process that has led us to our acquisitive, growth-oriented society. Seeing ourselves in this larger framework opens new perspectives on what is possible.

The gathering lifestyle lasted up until a few thousand years ago when agriculture and civilization became dominant. Then populations began to grow much more rapidly. The reasons for that growth are clear enough in terms of food supply. Gatherers live at very low population densities generally. Farming can support many more people in a given area. Furthermore, the impact of the starchy diet common among subsistence agriculturalists is to increase women's fertility when compared to the diet of most gatherers.

As populations grew, the nature of human societies shifted dramatically as they found themselves in a perpetual race with population growth, ecological depletion, and other groups around them. **This resulted in a perpetual need to intensify production, to produce more from the**

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1 Lee, Richard B. *The !Kung San, Men, Women and Work in a Foraging Society*, Cambridge University Press, Cambridge, 1979, p.457-458

land through more intensive farming methods.[1] It was this race that gave birth to rapid technological change, not leisure as is often assumed. Once the race was begun in a given area, as with tribes living in a river valley, the tendency to strictly limit population was turned on its head in favor of generating more growth in order to more effectively compete with other groups.

The demand to intensify production is the root of social stratification. Many writers simply point out the correlation – the development of grain-based agriculture which led to store-able food surpluses which then led to the development of class stratification. The assumption is that class stratification was born because leaders could store a surplus of grain. Such an argument assumes that we have an innate, latent tendency to stratify that was simply awaiting the arrival of the right circumstance. The evidence does not suggest such to be true. Numerous tribal groups achieved considerable levels of stratification without store-able grains. Many groups have had access to store-able grains and have not developed significantly stratified societies.

The clearest way to understand class stratification is organizational capacity, which refers to a group's ability to accomplish arduous or undesirable tasks quickly. Put simply, stratified social groups have a higher organizational capacity. Stratified groups are not smarter, or more sustainable, nor do they in any way represent a "higher" social order. They simply organize workers and soldiers more effectively. (This is borne out by studies conducted by Marshal Sahlins among pacific island cultures which correlated the productive intensity of various Polynesian societies with their level of social stratificiation.)[2] Sadly, **the trade-off has been between organizational capacity and conscious culture.** More stratified groups tend to have a higher level of organizational capacity, but also have more mechanisms that serve to suppress social awareness. Maximizing short-term competitive standing tends to make a culture less socially aware, whatever the nominal political or economic organizing principles (e.g. capitalist, communist, etc.) of that society.

The development of class stratification is intimately linked with the

1 Harris, Marvin, *Cannibals and Kings, The Origins of Cultures*, Vintage Books, New York, 1978

2 Sahlins, Marshall, *Social Stratification in Polynesia*, University of Washington Press, Seattle, 1958

development of male supremacy.[3] As human cultures stratified, village headmen arose. Headmen among small groups have no coercive power, they are rather like village cheerleaders whose job it is to focus the group's efforts and encourage people to work harder. Among some groups, there were rituals of competitive feasting whereby groups competed to give the most lavish feast to their neighbors. They competed to see who could be the most generous, to see who could give away the most. Different forms of competitive feasting or competitive giving occurred in many cultures around the world. So much for an acquisitive human nature!

As populations grew, the role of headmen grew in importance. They became chiefs with more power and some privilege, though often not much depending on the group. Their role as headmen was dependent on their service to the group, as a focalizer of labor effort, as an organizer and defender in time of war. Their job was to be a "great provider" of food and protection. This tradition of leader as "great provider" remained up until very recently. Some studies of how pre-colonial kings responded to droughts, floods, and other disasters indicates that they may well have done a better job of protecting their populations than colonial administrators assigned by European powers as they colonized many parts of the world.[2]

In time, the leaders who served the group accrued so much power that they became a separate class that could serve themselves, often at the expense of the group, without others being able to effectively control that class's actions. Still, the upper class had to maintain their legitimacy as "great providers," as defenders of the group's interests. The relationship between a populace and its leadership, chosen or imposed, is a dynamic one, to say the least.

Social stratification developed out of a need to intensify production, a need to increase the organizational capacity of the group so people would work harder under conditions of population growth and

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3 For more information on male supremacy and how it is tied to modern issues such as the abortion debate and energy supplies, see my prior book. Zeigler, Alexis, *Culture Change, Civil Liberty, Peak Oil, and the End of Empire,*Ecodem Press, Charlottesville, 2007, also at conev.org

2 Davis, Mike, *Late Victorian Holocausts, El Nino Famines and the Making of the Third World*, Verso, London, NY, 2001

increasing ecological stress. Now that our society has become so inextricably and intimately class stratified, it is difficult for modern people, liberal or conservative, academic or not, to conceive of the extent to which our culture is shaped by the demand to maintain that stratification. Much of our value system, much of our cosmology, is designed to explain and defend class stratification.

Choosing Our Future

I hold no illusions about how difficult it can be to get people to make fundamental changes in how they live. But it is narrow-minded of us to assume that, given the tremendous diversity in how humans live and behave, that we cannot influence such factors. Ultimately, it is our only hope.

Most people in most cultures throughout tens of thousands of years of human history lived in relatively egalitarian, peaceful bands that disdained greedy, acquisitive, or boastful behavior. Is there any real hope of unwinding our selfishness in favor of a more peaceful and sustainable future? There most certainly is such hope. It is a task that is at the same time nearly impossible, and quite easy. **We simply have to break the illusion that convinces us to perpetually look upward for answers, the illusion that convinces us great leaders drive history forward.**

It is difficult to know how conscious ancient hunter-gatherers were tens of thousands of years ago in choosing their social structures. There is a plausible argument to be made that they were indeed at least somewhat conscious of how their behavior impacted their environment and their culture into the future. The Mbuti (Pygmies) and other hunter-gatherer groups that have survived into modern times have informed anthropologists that they are well aware of the need to maintain low population densities in order to maintain a beneficial relationship to their environment, in order to maintain their gathering lifestyle.[1]

When we notice the conscious intent of gatherers who have survived into modern times to limit their population growth, and notice that humans lived in gathering cultures for many millennia with very low growth, it is plausible to suggest that for tens of thousands of years humans consciously limited their population growth intentionally in order to

1 Turnbull, Colin M., *The Forest People*, Simon and Schuster, 1962

sustain their gathering lifestyle. **Perhaps the notion of a conscious culture is not new, but rather very old.** It is also plausible to suggest that the process of cultural change from small, egalitarian band-level societies to large, stratified societies involved a decrease in social awareness, a decrease in the ability of groups to consciously choose their future.

In either case, it is clear at this point that we cannot go backward. The task ahead of us is new; to create a culture that is both large and consciously chooses its future. It has never been done before. Our survival depends on it.

Mind Games

The dilemma of organizational capacity versus awareness still reigns supreme. But it is a game that is not consciously discussed. In terms of modern political affiliations, it would be uncomfortable for the "right" to admit that modern western lifestyles are dependent on a high volume of inputs (commodities and cash) from the "underdeveloped" world. For leftists, they are loath to admit the extent to which the system is blind, not driven in the long term by their political influence, ideas, or educated opinions, or the extent to which they too are the beneficiaries of inequality. The tendency to suppress knowledge that makes us uncomfortable, or for powerful vested interests to suppress information, is common in human cultures. A few examples are instructive.

In some areas of India, the traditional Hindu belief system venerated cows as sacred animals. Modern anthropologists have documented the extent to which cows were (and to some extent still are) vital to the economy for rural peoples. The cows roam about and eat roughage that is not food for humans. The cows supply milk, dung which is used for fertilizer and fuel, and are used to plow the fields. In short, for traditional peoples living in India, they were much better off keeping their cows alive than making them into food. But the farmers still faced a dilemma of modifying the gender ratios of their calves. They might have needed more cows for milk, or more bullocks for traction animals. They resolved this dilemma by selectively neglecting calves of whichever gender they were trying to reduce, and those calves would perish. **They would rationalize their behavior and say that the calves were weaker anyway. They denied any role in the demise of the undesired**

animals.[1]

Another example comes from the Tiwi, an aboriginal group in Australia. Traditionally, there were no unmarried women among the Tiwi. Every adult female was nominally married to an adult male.[2] The Tiwi practiced polygyny, whereby one man was married to multiple women.[3] Often, old, powerful men would be nominally married to many, much younger women. The Tiwi were gatherers, and the productive units of Tiwi society were organized around these male-centered groups. The young women of these groups were, however, not to be restrained by unreasonable social norms. Nor were the young men who had not accumulated enough power to have wives. There were many illicit liaisons between unmarried young men and nominally married women. These resulted in pregnancies. But the old men in charge were well aware that they had not necessarily had sexual relations with their younger wives, thus many pregnancies were an obvious sign of rampant adultery.

How did the Tiwi deal with this? They were firmly convinced that pregnancy among humans had no relation to sex. One might be tempted to assume that they were simply ignorant. But one has to keep in mind that they were as smart as we are. They lived among the animals in nature every day of their lives. It would take an effort of mental re-arrangement to ignore certain rather obvious correlations. It is rather a case of a group organizing their cosmology to maintain the social peace. Whenever an older Tiwi man caught a young wife engaging in adultery, which happened occasionally, he was duty bound to engage the young man in question in a dangerous ritual of combat. **Thus a selective, purposeful ignorance served to keep the social peace.**

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1 Harris, Marvin, *Cows, Pigs, Wars and Witches, The Riddles of Culture*, Vintage Books, New York, 1978, Harris, Marvin, *Culture, People and Nature: An Introduction to General Anthropology*, Harper-Collins, 1993

2 Hart, C.M., *The Tiwi of North Australia*, Holt, Rinehart and Winston, New York, 1960

3 For more about male supremacy, see my prior book. Zeigler, Alexis, *Culture Change, Civil Liberty, Peak Oil, and the End of Empire,*Ecodem Press, Charlottesville, 2007, also at conev.org

Secrets

Let's look at some more examples of purposeful social ignorance among human groups. As much as we claim to venerate human life in modern times, the efficacy of our warfare and our tolerance for the harsher realities of social stratification belie our cosmology. The truth is that we are very selective about which lives we consider sacred. Pre-industrial people lived much closer to the realities of nature. Depending on their circumstance, overpopulation for them could have disastrous results. It is easy for us to judge, or to try to deny, but **the reality is that human infanticide was one of the most widely employed means of limiting population growth among our ancestors, even up until relatively recent times.** Many groups would abandon or kill newborn infants if they felt they could not afford to support them. They believed that newborns were not human because the spiritual being had not yet entered their body. Or they would say the infant was weak, and would have died anyway, in a manner similar to the explanations offered by Indian farmers who must kill their calves.

One of the secrets of early industrial Europe was that the level of infanticide was very high there as well. Women could suffocate their children and claim they had simply rolled over on top of them at night. A number of the early European states also set up foundling hospitals, orphanages with rotating boxes set in the walls of the buildings so infants could be anonymously abandoned. The survival rate in the foundling hospitals varied from 10-25%. They were in fact state-sanctioned infanticide facilities. The people who abandoned their infants were aware of the likely fate of the children in such facilities, but it was a means of exercising a grim necessity of population limitation within the cosmology of the time.

The truth is that **empires always mythologically venerate life as a means of assuaging their colonized subjects and lower classes.** These same empires are far more rapacious and deadly than smaller cultures who are more clear and direct in their behavior and intent. That is why we venerate life in the manner that we do even as we enact international economic and military policies that doom millions of human beings to untimely deaths. Thus we see the sharp edges that lie just beyond the bounds of our cosmological comfort.

The Myth-Bound Society

It is useful to look at far-away peoples – poor Indian farmers, Tiwi, early industrial Europe – because they are outside of our cosmology. Their behavior does not insult us personally. **The reality is that human mental culture is a creation that involves as much suppression as illumination of the world around us. We selectively choose our reality to make ourselves comfortable, to make the different piece of our world fit together in a coherent fashion, and to rationalize stratification.**

All human cultures do similar things. The problem has been grossly compounded by the level of social stratification in our society. This is obvious with some vested interests engaged in direct suppression of social awareness, as when Exxon chose to spend millions of dollars to suppress an awareness of climate change. Similar kinds of suppression occur in many areas of society. **Everything we know about medicine, the environment, poverty, war and peace, has been influenced by the activities of vested interests trying to make more money and dominate markets.**

The more subtle and important point is the extent to which a suppression of social awareness has become embedded in the social fabric of our society in ways that make us more comfortable, serve our immediate interests, and yet are far from obvious. The aforementioned belief in conscious control is perhaps the most pervasive of such repressions. The belief in the benign nature of technological progress is similar. The myth that technological change can overcome any obstacle may make us feel comfortable, but it encourages us to ignore the depletion of fossil fuel and other vital resources, and is a gross distortion of the realities of our history and current circumstance.

The real kicker is the extent to which educated persons in western society have become convinced of their ability to live above mythology. **We are as myth-bound as any society that came before us, and yet we are currently denying it.** How could we have become so misinformed? History has played a nasty trick on us. We developed an acute intelligence in gathering tribes that allowed us to build gathering baskets and spears, but more significantly, allowed us to create and navigate a complex social order. Many, if not most, pre-industrial cultures cannot

count past three, never mind use trigonometry or calculus. Human intelligence was useful to them to comprehend the social order, to figure out who was an ally, who was being duplicitous, to cooperate effectively in gathering and hunting activities. As societies grew larger, they sacrificed social awareness for increased organizational capacity through class stratification. These social hierarchies grew larger, and ultimately self-serving.[1]

We transposed our social intelligence onto the mechanical world, and with the help of fossil fuel, created a miracle of technological growth. In the period of growth we have experienced, it was economically useful to expand civil liberty. We tend to imagine that such an expansion of civil liberty was a conscious choice, but it was not entirely so. Our current place in history has led us to believe that we have far more conscious influence over our society than we have had. **We have lived in an Age of Reason because of the great economic expansion of our time.** The extent to which our society is dominated by non-conscious forces, the extent to which vested interests serve to suppress social awareness among common people or in academia, is a thought that would simply be too disruptive to our cosmology. We are like the Tiwi. We just can't stand to think the obvious.

Supporting the Suppression of Social Intelligence?

It is not news to anyone that the divisions of wealth and power in our time have an impact on our culture and beliefs. The great tragedy is the extent to which open-minded intelligent people wittingly or unwittingly cooperate with the suppression of social awareness. Ultimately, any hierarchical social order stands not on the strength or suppressive power of a king, dictator, or corporate CEO. Rather, the edifice of social stratification is maintained by a system of rewards that is carefully trickled down the social ladder. Depending on the budget of the King, it is trickled as far as possible. But ultimately, it is the middle-rung beneficiaries of largess who hold up the whole structure.

In terms of understanding the real roots of the enormous environmental and political problems that beset our species at this time, it is educated

1 The cognitive-developmental means of selective social awareness is discussed in my prior book. Zeigler, Alexis, *Culture Change, Civil Liberty, Peak Oil, and the End of Empire,* Ecodem Press, Charlottesville, 2007, also at conev.org

westerners, liberal and conservative alike, who are the ultimate suppressors of social awareness, of a conscious culture. **Our own presumptuous belief that our morals, our science, democracy, and "civilization," are the most important thing in history is chiseled out of the granite illusion that we determine the course of history with our consciousness.**

The scale of our failure is beyond momentous. It is propelling us towards a biblical Armageddon of our civilization. The horsemen of the apocalypse are the contraction of the energy supply coupled with dramatic disruption of all of the ecological support systems that make life on Earth possible. It is an unnecessary catastrophe, one of our own choosing. The remedy lies in comprehending that we ourselves are ultimately animals who breathe the air generated by living plants, and drink the water created by the hydrological cycles of nature. **Our culture is not above nature, not above the material world. Rather it is guided and created by that material world, and we must make our economy and our society support the health and vitality of the web of life.**

An Unnecessary Apocalypse

We are facing an unnecessary apocalypse. We cannot avoid catastrophe with changes in political policy, or with small modifications to the western world view. We must have a deeper understanding of ourselves, and we must apply it. We have to have a science of culture and its patterns. And that science must be applied in an effective social movement. It will be resisted.

And we must clarify "we." The great unraveling is upon us. The momentous battles that were fought between empires, between various factions who called themselves capitalist, communist, or socialist, is about to explode again. **The global market economy appears benign under conditions of growth. As that growth stalls and reverses, the old battle between the classes about who controls wealth will become a matter of life and death for most of humanity.**

In that context, as has been true in the past, many of the western elite, including and especially the most educated, will endeavor to make it look like they are in charge. In doing so, they will continue and deepen the great illusion of conscious control. They will aggressively suppress the

development of a real science of culture. That science by its nature challenges their position. Coupled with this defense of archaic and repressive social orders will be an escalation of supernaturalism and fundamentalism, social movements equally as hostile to a science of culture as academia.

Tragically for the human species, a real understanding of ourselves is inextricably politicized. To understand why our population grows, why we consume so much, why we choose to be greedy or altruistic, to understand these things means challenging the foundations of the class society. It cannot be otherwise.

If you assume you cannot impact the basic structure of your culture and its values, then you will not be able to help solve climate change or any of our significant environmental problems. **Green hyper-consumption will not save us. It is a lie; it cannot be done that way.** Our leaders, political and environmental alike, are telling people what they want to hear, leaving them and ourselves firmly rooted in our cultural mythology.

If we assume that we can consciously choose the basic structure of our society and thereby consciously choose our values and our lifestyle, the technological side of conservation becomes terribly easy. Our non-conscious culture cannot effectively solve climate change. The non-conscious cultural system, which is a global system at this point, will continue its destructive path, regardless of whatever collapse, contraction, or cycles of growth we may go through, for millennia to come. A conscious cultural system represents a different means of adapting to our environments. Seemingly insolvable problems would become solvable.

Chapter Eight: Peak Democracy?

It is taboo in the modern social sciences to suggest a direct and powerful link between the ecological circumstance of people and their beliefs, attitudes, and ethics. The physical-mental link influences our politics on every level, and yet any awareness of it is actively suppressed by our mythology, which makes the ideas of professors, politicians and preachers seem more important than the supply of oil, topsoil, or trees. It is a most terrible and dangerous delusion.

The truth is that our most precious civil liberties are not simply a political choice that we make, not a simply a social invention. Rather, **our civic life is directly tied to the state of ecology and economy that underlies our lifestyle.** A brief look at some of our history bears out this point.

Before Stratification

In general, the citizens of band and village level societies of our ancestors enjoyed a high level of freedom, if for no other reason than the suppression of civil liberty would have taken an effort that would have been out of place in subsistence societies. Every culture has social norms and enforces those social norms. **The hunter gatherers who have lived into modern times actively, aggressively suppress such behaviors as we might call selfishness, greed, or braggadocio.**

If we look at tribes ruled by chiefs, even they had less power than we might imagine. Most early leaders were charismatic leaders, servants of their followers as "great providers" with no coercive power. It is not until the development of large tribal and proto-state level societies that chiefs gain enough power to be able to coerce anyone. **As tribes became states, however, they were universally militarized, male supremacist, class or caste based, and restrictive of the civil liberties of commoners.**

Sometimes when I am traveling conducting presentations, I show a slide of Dagon, an archaic deity from ancient villages along the coast of what we now call Lebanon. Dagon was portrayed as a fish-god, a being with a fish tail and body, but also arms and legs like a human. I ask my audience; "Did the people who worshiped Dagon live along the coast, or

in the mountains"? Baited question, of course. Then I ask them, "What do you suppose they did for a living"? "They were fisher-people, of course," is the answer.

Then I ask them other questions, about modern religious symbols, or political circumstances. Sometimes I ask my audiences about the ancient Greeks, about why they developed a limited democracy when all of the historical precedents were towards tyranny and a centralization of power. Invariably, I get answers relating to the philosophies and ideas of the early Greeks.

Now consider this. When you look at Dagon, the ancient fish-god, it is painfully obvious that the people who worshiped that deity lived near the ocean, and that they caught fish to sustain themselves. **When you are looking at humans who have no pre-established place in your cosmology, you make the obvious connection between economy and belief, even religion. When we look at ourselves, or people in our direct cultural lineage, we assign their behavior to mental factors, to ideas and inventions.**

Lessons from Ancient Democracies

The unspoken, unflattering truth about democracy, ancient and modern, is that it is directly linked to ecology and economy, just like Dagon. The story goes like this. (I looked at Greek and Roman developments in my book *Culture Change,* so I am only going to touch on them here.) About 500 B.C., Greece went through an extraordinary democratic expansion as male citizens gained the right to vote. Women and slaves gained greater measures of liberty than prior times, though never as much as male citizens. There was a great flourishing of science and philosophy, as Plato, Socrates and their cohorts wrote their names indelibly into history.

The ancient Greeks inhabited a land that was not highly fertile. In some ways this facilitated their democratic development, because they did not live in a fertile river valley where production could be highly intensified, and ultimately controlled, by a state apparatus. Nonetheless, the ancient Greek tribes did consolidate into state-level society, first the Mycenaean civilization, and then the classic Greek state. Because of population growth and the weakness of the soil of their native land, the Greeks set about conquering, colonizing, and trading with different groups all

around the Mediterranean. The Greeks established numerous colonies. **The Greeks were the first state-level society where trade became a primary source of wealth and power.** As Greek colonialism brought increasing wealth home to the mother state, the mercantile class gained in economic power until its members were finally able to vie for power with the traditional landed elite. We have a very mental notion, a very self-flattering idea of what democracy means. The reality is much simpler. ***Democracy is the means by which economically empowered persons express that power in the political forum.***

The prominence of trade differentiates Greece from the other ancient states who were without exception centered around circumscribed areas of fertile land (river valleys mostly). In the circumscribed river valleys of the Nile, the Indus, the Tigris and Euphrates, and the Yellow Rivers, states developed means of taxation and control within the bureaucratic apparatus that served to limit the power of the middle echelons of society. In Greece, it was precisely these mid-level traders who ultimately gained the upper hand. **It was economically functional for Greek society to open up and become a freer society where vital commerce flourished.** Science, philosophy and art came along for the ride. As time passed, the Greeks faced the price of the ecological unsustainability of their agriculture and increasing competition from upstart states. As Greek power waned, democracy declined in favor of state power.

Although it is less commonly recognized, the Roman Empire went through a period of democratic expansion that was in many ways very similar to that of the Greeks. The Roman state, like the Greek state, grew out of a set of competing chiefdoms that were eventually consolidated under authoritarian rule. The Romans, like the Greeks, became a regional imperial power, and a very successful one. **The peak of Roman democracy occurred, not coincidentally, with the peak of prosperity that occurred in the early Roman empire.** At the peak of Roman Democratic development, the Plebeian Assembly, which was elected by the citizenry, gained the right to veto acts of the more conservative Senate. Ordinary citizens gained the right of access to the Roman courts where they could defend themselves under the law even against powerful opponents. Not coincidentally, this was the period of peak profitability for Roman colonialism. For a time, Roman citizens did not even have to pay taxes. The profits of colonial exploit were sufficient to finance the

Roman state apparatus without domestic taxation.

As the Roman Empire became more embattled, democracy was set aside in favor of authoritarian rule. Interestingly enough, one of the groups that was fighting Roman imperial rule when the Romans made the transition point from limited democracy to dictatorship was a fringe group we now call Christians.

The Development of Democracy in Europe

The evolution of democracy in Europe followed a similar set of patterns. The European powers who had better access to water-borne transportation – particularly the English, French, and Dutch – gained an early advantage as commerce, capitalism and industry were beginning to gain a foothold as economically important forces. The western powers actively sought to suppress the commercial and military standing of Eastern Europe and the Balkans. In that sense, these latter areas were the first "third world," to draw a more modern parallel. Even though some of the eastern powers themselves became powerful states (Russia most notable among them), they were consistently in second-place compared to the more rapidly expanding western powers.

Just as democracy expanded as a commercial class vied for power in Greece and Rome, so it expanded in Europe. We think of democracy as growing up from the depths, of pauperized peasants rising up to demand their rights. That's not what happened. Democracy in Europe moved forward in fits and starts, revolutions and bloody revolts that moved liberty forward, only to have the gains reversed by the re-established power of the Kings and the Catholic Church. The French revolution was propelled by the upstart middle – the artisans, mercantilists, and intellectuals – not by poor farmers. (Though the revolution went through a number of convolutions, and the poorest classes did play a significant role, they were not the primary organizers.)

In the late 1840s, a series of revolutions swept all across Europe and shook the foundations of society. Again, it was led by the upstart middle class, not by impoverished peasants. In fact, at various points in European history, the peasants turned to the King for support, the ancient "great provider" in the mold of chiefs who were personally responsible for the well-being of their followers. The peasants often took sides with

the king against the middle class traders and artisans who were themselves at times exploiting the poor. At other times, the middle and lower classes banded together to oppose the upper class, and that is when the most profound changes occurred.

It is no coincidence that the most successful colonialists also experienced the most rapid democratic development, and that democratic development was led by the mercantilists and the upstart middle class. Russia was a great power, but could never afford to both finance its military and expand the wages of workers. The western powers could afford to do both. Germany/Austria was, in every way, caught in the middle. Possessed of greater transportation advantage than Russia, a colonial power, but not as successful in that regard as France or England. Germany's political system displayed their intermediate role. Germany/Austria was well-endowed with natural resources. They experienced more democratic development than Russia, occurring through the same revolutionary processes as the western powers, but never quite gained the upper hand. That imperial contest led ultimately to two world wars.

Colonialism and Democracy

A few points are to be taken. **Large-scale political democracy has never existed in the absence of colonialism.** The colonial winners are those who experience the greatest democratic expansion. The expansion of a mercantile society, the need for that society to freely move goods, ideas, and services about provides for an expansion of democracy.

As an activist, I am personally aware that such changes are in no way mechanical, unilinear, or simple. As an activist, one becomes personally aware that power is always taken, never given. Looking back across centuries of history, it is easy to point out correlations. The reality is that different economic circumstances favor different social movements at different times. The Russian anarchists and other democratic reformers were well organized and dedicated. Their western counterparts were more successful because the societies in which they lived were better positioned to expand democracy. **While Russia and the other colonial "losers" could not afford to pay both their soldiers and their workers an ever increasing wage, the western powers were sufficiently wealthy that they found it ultimately cheaper to pay workers than to**

fight them. It was more profitable for the French and English to become more democratic, whereas it was a military necessity for the Russians to maintain greater central control.

Democratic Development in the U.S.

With democratic development in the United States, we can look at the development of liberty in more detail. In the U.S., and indeed in modern Europe, democratic rights have continued to expand far beyond their archaic boundaries. Looking at the position of women in the political process is especially interesting.[1]

The development of women's rights in the U.S. parallels that in other cultures. **The single, strongest correlation with women's rights in human cultures all over the world is their economic position.** Where women are economically empowered and involved, they have political rights. Where they are economically excluded, they are politically excluded. The same is true even of the smallest of human societies. The women of the Mbuti or !Kung in Africa gathered most of the food that their respective groups ate. They also had considerable power and voice in their societies. Among the Inuit (Eskimos) who lived in the northern regions, the men did all the hunting and the women stayed home. Inuit women had less political power than women among the !Kung or Mbuti.

The economic influences over women's position in society is clear in the U.S. as well. Surprisingly to many, women in many areas in colonial America had the right to vote, the right to inherit property, and the right to sit on juries. Although colonial America was not a gender-equal society, it was more so than America in the 1800s. Colonial America was an agrarian society where men and women worked side by side in the fields. As the U.S. industrialized after the revolution, men went to work, and women stayed home. Women lost their right to vote, the right to sit on juries or inherit property. They became de-facto property of their husbands.

A diverse range of leaders got in on the act of pressuring women into a politically marginalized role in American society in the early 1800s.

1 This subject is covered in more detail in my prior book. Zeigler, Alexis, *Culture Change, Civil Liberty, Peak Oil, and the End of Empire,*Ecodem Press, Charlottesville, 2007, also at conev.org

Again, these kinds of changes are not mechanical or simple. They play themselves out through social movements and the complex relations of groups of people. Nonetheless, it is as if we have an intuition about the direction of the larger social system, and act out those changes at a personal level. In the early 1800s, preachers, pundits, politicians, academics and doctors all worked together in an unspoken conspiracy to re-define women's social roles. No one sat down and drew up the script, but still many actors worked in concert. Women were defined as being beautiful but frail, needing to stay home and take care of children. They were said to have minds not well suited to business or legal affairs. Doctors ascribed to them all manner of peculiarly female illness and hysteria.

That circumstance prevailed throughout much of the 1800s. By the late 1800s, women began moving back into the labor force in significant numbers, largely in gender segregated professions like teaching and nursing. Not coincidentally, their public image began to change. Women were portrayed in more practical clothing. Over time they came to be seen as intelligent, capable, worthy of the right to vote. **The U.S. was the most rapidly growing of the industrial/colonial powers, and the first to grant women the right to vote.**

Women continued to expand their legal rights and social freedoms through the 1920s in spite of the dominance of conservative politics in the white house. (Historically, there is no correlation between women's roles and what we call conservative or liberal political dominance.) The expansion of women's role suffered a setback in the Great Depression. Some government agencies fired women in favor of hiring “male breadwinners.”

Even though World War II brought an upsurge of employment for women, they did not expand their rights in that time either, arguably because of the pressures of war itself. (Warfare is universally correlated in human cultures with a denigration of women's rights.) The peak of employment reached for women in World War II was surpassed by the mid 1950s. Not long after that, we see the rise of the modern feminist movement.

Economic Influences on the Civil Rights Movement

Similar points can be made about the civil rights movement launched by blacks in the 1950s and into the 1960s. The standard story of the Civil Rights Movement tells of blacks being displaced from southern agriculture by mechanization, and moving to the cities only to face further segregation and ghettos. While that is true, it is also true that **the wages of blacks in the post World War II era were growing more than 10% faster than that of whites.**[1] (This is discussed further in *Culture Change.*) Again, we can see that improved economic position supports the development of civil liberty, but not in a unilinear, mechanical fashion. Rather, ecological circumstance (a bountiful supply of oil and resources) provides for an economic circumstance (the rapid economic expansion of western states) that plays to the favor of social movements that seek to expand our civil liberty. **Democracy is the process by which economically empowered persons express that power in the political forum, and periods of economic expansion, heretofore always financed by exploitation of other nations, have allowed for ever growing numbers of people to experience economic empowerment, and thus we have seen a growth of democracy.**

The concurrence of an expansion of civil liberty with the profound economic changes of the last few centuries is the "nasty trick" of history I referred to earlier. We are convinced that we created both technological change and an expansion of civil liberty with our conscious will. The proof is manifest around us everyday – our world has undergone incredible change since the "Dark Ages." Thus the recent retreat from science into fundamentalism becomes an "Assault on Reason," to use the title from one of Al Gore's books, which assumes we created the "Age of Reason" with our conscious will.

The fact that we consciously created our democracy and expanded our civil liberty through hard-fought social movements is as obvious as the nose on your face. (Gore attributes the "Age of Reason" to the printing press, a free media, and the wisdom of founding fathers.) Like many intuitions, it's wrong. **Economic and ecological change made those movements possible.** But that is so humbling, so hard to sell to any constituency one might seek to impress, that the most powerful realities

1 Perelman, Micheal, *The Pathology of the US Economy, The Intractable Contradictions of US Policy*, Palgrave, NY, NY, 2002, p.35

influencing our modern life remain hidden before our very eyes.

Dethroning Modern Illusions

Any discussion of the ecological and economic roots of democracy is suppressed because it does not fit our mythology. To dethrone the deity of conscious control is anathema. It reduces those who would portray themselves as the great leaders of history, the guardians of ethics and reason, to being the servants of historical processes rather than their masters.

Any recognition of the power of economy and ecology would threaten to dethrone another deity, and that is the deity of Progress. We conceive of Progress as being not only a issue of machines, but of social inventions as well. **The truth about democracy is that it came about because it was economically useful, it is based on exploitation of poorer nations, it has waned in the past when it ceased to be profitable, and it will likely wane in the future under conditions of ecological and economic contraction, just like the democracy of past civilizations fell as they went into contraction. Unless we change course, these things will come to pass.** All of that is humiliating in comparison to the great flattering mythology of Progress.

The economy speaks with a powerful voice. For a couple of hundred years now, it has been screaming with words, echoed through the mouths of preachers, academics, and politicians alike, left, right and center, that progress is good, that things are good and getting better. And now, as we stand on the deck of this mighty ship, to suggest that the ship itself might be sinking – it's a hard sell. If we look at the reality of history beyond the myths of our cosmology, the hole in the hull of the boat can actually be repaired fairly easily. But almost every aspect, almost every interest group in our current non-conscious culture, pulls the attention of people away from the real solutions. Pretty green paint on the banisters will not help. We have a much more serious set of problems than that. History is happy to show us the real problems, the real solutions, if we have the sense and the courage to look, to ignore the booming voices that suppress an awareness of our true connections to the Earth on which we live.

Chapter Nine: Heaven and Hell

While there are many uncertainties concerning the future of the modern industrial economy on the planet Earth, **there is no doubting that the coming decades will see some form of economic contraction.** The limitations of the supply of cheap energy combined with the many ecological limits we have been so enthusiastically ignoring will make themselves felt.

While most environmental writers try to portray such dangers as a future in which "we" will all suffer the pain of facing the limits, the reality is that **a maturing market economy in a stratified world is already shifting, and will continue to shift, the burden of ecological limits onto the backs of the global poor.** The shifting of ecological burdens onto the poor is already in full swing as we claim the global grain supply as fuel for our cars and feed for our cattle, and food prices have risen dramatically. This is only the beginning of things to come if we simply allow the global market economy, and the global non-conscious cultural system to run their course.

We stand at the gates of both Heaven and Hell. We have the ability now to live with greater comfort and security, and to provide that security to more people, and to do so indefinitely, if we choose. But if we let things take their existing course, we are going to be delivered into a Hell whereby the global market economy starves half or more of the human species. The course of the global market under conditions of contraction is genocide, widespread ecocide, and large scale resource wars. That is the current course on which we are set, but it is not pre-destined.

The Unnecessary Apocalypse

It is completely unnecessary that we should go such a direction. If you and I and enough of us have the courage to step outside of the ruts of history, to endure embarrassment, and sacrifice, we can avoid catastrophe. If we can focus our vision so that it is sufficiently far-reaching, we can use the extraordinary tools at our disposal to help deliver an age of peace and sustainability. **The sacrifice of changing habits will be short-term, because ultimately the conscious society will bring us more freedom, health, and well-being as we share more and consume less.**

The age of peace will not come as a result of personal acts of conservation alone. If personal acts of conservation can lead us to a larger, coordinated, intelligent movement then that conservation will be called noble. If your acts of personal conservation serve only to relieve you from a momentary pang of guilt without bringing you to participate in a movement that can consciously remake the foundations of our society, then you will be part of forcing onto your children and grandchildren a world of starvation, war, and the mass destruction of nature. Heaven and hell. You have the choice.

Dominion Versus Conscious Culture

Climate change is NOT the result of an immutable human nature. It is the result of specific choices we have made in the context of our non-conscious culture to seek dominion. That drive to dominion has been quite successful. And now we stand to be the Lords of the Flies, the masters of a degraded Earth. It is not inevitable that we should over-populate and over-consume. We have chosen to do so, and **by creating a culture that can make more conscious choices, we could choose to do otherwise, to create a culture of sustainability.** But it cannot be done piecemeal. The same cultural mechanisms that propel the War on Drugs, the War on Terrorism, and the other forces that seek to create conformity in our society at the expense of social awareness also serve to suppress ecological awareness.[1]

The solutions to climate change, the limitations of our energy supply, and the geometric growth of hyper-consumption are at once both very difficult and terribly simple. The simple part is that the technological side is already done. If we come up with better ways of conserving energy and resources, fine, but we don't need them. **All we need is for you, and I, and a whole lot of us to take what we know and act on it.** If you take the technologies you already have for growing food locally and organically, for living and utilizing resources cooperatively, for biking, walking and advocating for mass transit, for insulating buildings well and sharing tools and machines, for building solar hot water systems, composting toilets, and a meager sustainable supply of renewable

1 As regards the wars on drugs, terrorism, etc, see the disussion of witch hunting in my book. Zeigler, Alexis, *Culture Change, Civil Liberty, Peak Oil, and the End of Empire, Ecodem Press, Charlottesville, 2007*

energy, then you are choosing a direct and powerful path to reversing the great course of destruction on which we have been set. We cannot do it one by one, and we have to understand that renewable energy will be truly meager compared the grand inferno of fossil fuel combustion that is presently threatening to engulf our Earth in an apocalypse of marketplace genocide, ecocide, and war.

Choices

Hell is putting green paint on biofueled private cars. Heaven comes from getting together with networks of people, meeting and talking face to face, finding ways to support each other and build a larger movement. Rest assured, the age of change is upon us. **If we wait until we have to change, until the circumstances of decline force us to abandon our old ways, then the forces of history will deliver us very predictably into the hands of authoritarian government and accelerating ecological decline.**

Democracy is not an invention of great white men. It is, among other things, an economic system well suited to growth. **If we want to maintain our most cherished freedoms, comfort, and security into the future, we have to lead the curve, not follow it.** We have get ahead of the stress-response mechanisms embedded in our culture.

In the coming decades, if we should succeed in making our culture more conscious, truly sustainable, I do not know exactly what that will look like. I do not think it will be a society that seeks to ameliorate injustice through micro-managed regulation. Any power to do good can in time become a power to do harm. That is the nature of power. But if you look at the great economic and moral thinkers of history, and separate their ideals from the perversions created by political movements, you find that capitalism as espoused by Adam Smith, Marxism, Socialism, the early Christian movement, all had in common the belief that wealth, ownership, and power should be in the hands of the people. All of these philosophies hold at their core the belief that ordinary people should have immediate access and control over the productive processes on which they rely. Adam Smith was vehemently opposed to corporate consolidation and an economy that operated without ethical boundaries. He would in no way support the modern economy that calls itself capitalist. Likewise, hundreds of social movements have arisen through

history to demand that the wealth of society be shared communally for the good of all, one of the most noteworthy being the early Christians.

The terrible conundrum is that of organizational capacity. Historically societies that disperse wealth and power to the lowest levels have not necessarily been able to compete with other societies that concentrate wealth and power in the hands of military and political leaders. And thus we have a battle between the classes, the masses rising up to demand their share, the upper class offering to coordinate the collective dominion over other societies. Of course, the upper class is never so publicly minded as that, and most often takes the greater part of the largess provided by state sponsorship or market profit and expends it for more selfish purposes.

Contradictions

Some of the greatest truths are embedded in contradictions. The contradiction of organizational capacity versus a conscious society will determine which fate we face. We are well on our way to Hell at the moment. But the long term trajectory of that course is so terrible, and with so many better options right at our fingertips, you must strive with every resource at your disposal to escape the ruts established for us by history.

Politics is at once the most important aspect of our future and the least. On the one hand, we do not need any politician's permission to build a conscious society. The means are at hand already. One day we may face the suppression of our efforts to build a sustainable and conscious society, but that day is not today. If we focus too much on electing the right president, we lose sight of our individual and collective power as ordinary people. We have the power, the ability, to create a revolution of sustainability. We do not need anyone's permission.

A society as divided as ours – globally and nationally – cannot become conscious, cannot rationally or intelligently solve large scale social problems. The mechanisms of suppression are too strong, too pervasive, too mutually supporting, so we must build a conscious society from the ground up instead. Just as our current society is systematically non-conscious, a conscious society would not address "issues." Rather, it would seek a different social order, one that maximizes the social

awareness of all citizens, and supports the application of that awareness to solving our seemingly intractable problems.

The Second Great Leap

A conscious society has never been created on a mass scale. It is impossible for any highly class-divided society to have a socially intelligent problem-solving process. Social technology, like mechanical technology, is complementary, meaning technologies support each other. That means that an internal combustion engine could not be built until a sufficient understanding of electricity had been developed to create a spark plug. The computer was dependent on the development of resistors, transistors, and integrated circuits. The pieces have to come together. Likewise with social technology. In a highly class-divided society, one set of vested interests suppresses information about poverty, another about particular environmental concerns. Some information cannot develop or be disseminated because it simply doesn't fit into the dominant world view of the culture.

In highly stratified cultures, citizens are taught to look upward, to hold faith in religious, scientific, and political institutions. This means that the areas of discomfort, the thoughts that are too painful to think, become large. For these reasons, **a highly class-divided society can never be conscious or socially intelligent, and a conscious society will almost certainly be a highly decentralized one.**

Manipulations of Democracy

By what means, if any, a conscious society would maintain a central government or political system, is hard to say, other than the often quoted "democracy." Historically speaking, that term is problematic. A ruling class always prefers to rule under the guise of "democracy." It gives them legitimacy. As long as they can control the media and the means of communication to a substantial degree, allowing but at the same time limiting the scope of dissent as it occurs, then "democracy" is the preferred means by which the upper class legitimates its dominion over society. But our "democracy" effectively eliminates most important decisions from any public input. The greatest influences over human society are ecological and economic. Nothing about our long term ecological circumstance or the basic economic structure of our society is

decided through our current "democracy." It is precisely these things that must be decided through democratic means if our society is to become socially intelligent, capable of conscious decision making on a mass scale. In short, **political democracy will remain a tool of legitimizing the status quo until it can become decentralized economic democracy.**

The Conscious Society

A conscious society will seek to understand the historical patterns of human culture, to educate all persons about these patterns, and to undertake a long-term multi-level approach to creating our own future. **If you want to influence the ethical behavior of your grandchildren, the most effective means to do so is by consciously choosing the economy in which they live.** Economy does not dictate every personal act of morality or immorality, but on a broad social scale, the circumstances under which people live have overwhelming influence on how they treat each other.

Our current plan for the future is myth-based. Economic growth and technological innovation are supposed to deliver us to some kind of utopia. These myths are utterly devoid of any real understanding of human history, or of our future. You cannot deliver your grandchildren a sustainable and peaceful future by moral exhortation. A conscious society will take a systematic approach to social change, seeking at once to understand history, to influence politics in the long term by putting in place those economic structures which make real democracy possible. That means the decentralization of wealth and power that has been advocated by social leaders since time immemorial, though we have forgotten such noble goals in our orgy of fossil fuel fired growth and consumption.

A conscious society will seek youth empowerment and student-run education. It will seek to understand the importance of ecology and economy in influencing our politics and beliefs, and to popularize that information. As a result of the widespread awareness of these factors, every citizen will have some awareness of their role in the larger scale of history. We will collectively seek to understand our culture, and use that information to create an economy that creates the political culture that we seek decades and centuries into the future. Individual acts of violence

and exploitation will never be eliminated, but we can eliminate warfare and imperial dominion as the primary driving forces behind global political change. In their place, we will develop a bottom-up process of cultural change whereby people all over the world come to see their role in creating tomorrow's values by creating today's sustainable economy.

The End of Witch Hunting, the Beginning of Unity

A conscious society will inherently be highly resistant to internal division by witch hunting. Every generation will be encouraged to study anew the history of humanity, the means by which our species has been turned against itself so many times, only to leave us living in blind and self-destructive societies. Citizens who are aware of such history, who are themselves the inheritors of a sustainable and conscious society, will defend that social order, just as our hunting and gathering ancestors defended theirs for tens of thousands of years.

Heaven and hell lie at your doorstep. Social movements always start at the margins. Find the people who can help you create a more conscious society. Develop your own moral commitment. The movement we need to undertake is in so many ways already open to us. You already have the tools you need. All you have to do is break the spell of powerlessness, to move decisively toward new ways of understanding yourself in relation to the larger society. The power is in your hands. The fate of your children, their children, and a thousand generations to come lies in your hands. The fate of the living Earth itself lies in your hands. The time is now.

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