The Challenge of Sustainable Economic Growth

Revised (July 2011)

by

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Executive Summary

The exponential growth of global population and our economic system threaten the foundations of our way of life. Many analysts claim this exponential growth has already exceeded the carrying capacity of the earth. If this is accurate, we have little time to reduce our growth and resource use to a level below the earth's carrying capacity. If we do not act quickly and decisively we risk the collapse of our environment as well as our economic and social systems, just as happened to all the previous 18 complex societies in the earth's history.

This transition will be difficult because of the resistance of wishful thinkers who hope the science isn't accurate, and those who believe we can rely on innovation to grow our economy without limits. What makes it even harder to bring economic activity below the earth's carrying capacity is that capacity is declining due to the reduced availability of cheap carbon based fuel, the climate changes that are already baked into the system, species losses, and many other factors. If we are not successful in reversing our path, natural systems will do whatever is necessary to reduce our impact on the earth's resources whether we like it or not.

What does sustainable economic development mean if we face a prolonged period of no net economic growth? First, qualitative economic development can continue even if quantitative growth does not. We can focus on making our lives qualitatively better and reduce material consumption at the same time. Second, the best strategy for mitigating the risks of the transition to a steady-state economy, and adapting to the changes we cannot control, is to make our communities more resilient to economic, environmental and social shocks. We can increase our resilience by focusing on local self-reliance, diversity, environmental responsibility, economic vitality, meaningful work, social justice, collaboration, and cooperation.

Fortunately, many organizations are working on these challenges. For example, all of the Sustainable Economic Development Initiative's (SEDI's) projects advance these objectives in one way or another. Success will require generative leadership as well as the willingness to undertake the transition of outmoded attitudes, values and behaviors to ones more appropriate to a dynamic equilibrium economy. The challenges are monumental, but we are living in a time in which growing complexity and approaching tipping points make it possible for the relatively small actions of a few to trigger significant changes in our economic, environmental, and social systems. In this situation, we find ourselves committed not because we "ought to", but because we are compelled to do so.

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The Sinking Ship – A Parable

The ship was sinking---and sinking fast. The captain told the passengers and crew, "We've got to get the lifeboats in the water right away."

But the crew said, "First we have to end capitalist oppression of the working class. Then we'll take care of the lifeboats."

Then the women said, "First we want equal pay for equal work. The lifeboats can wait."

The racial minorities said, "First we need to end racial discrimination. Then seating in the lifeboats will be allotted fairly."

The captain said, "These are all important issues, but they won't matter a damn if we don't survive. We've got to lower the lifeboats right away!"

But the religionists said, "First we need to bring prayer back into the classroom. This is more important than lifeboats."

Then the pro-life contingent said, "First we must outlaw abortion. Fetuses have just as much right to be in those lifeboats as anyone else."

The right-to-choose contingent said, "First acknowledge our right to abortion, then we'll help with the lifeboats."

The socialists said, "First we must redistribute the wealth. Once that's done everyone will work equally hard at lowering the lifeboats."

The animal-rights activists said, "First we must end the use of animals in medical experiments. We can't let this be subordinated to lowering the lifeboats."

Finally the ship sank, and because none of the lifeboats had been lowered, everyone drowned.

The last thought of more than one of them was, "I never dreamed that solving humanity's problems would take so long---or that the ship would sink so SUDDENLY."[1]

[1] Quinn, Daniel, http://www.ishmael.com/Education/Parables/SinkingShip.shtml

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The Challenge of Sustainable Economic Development

Introduction

If Paul Revere were riding across the America of our times, alerting its populace to a major challenge, his message would not be about the coming of the British. It would be about the coming of a new world – not a new planet, but a transformation of our existing world into a new reality. We are in the midst of a profoundly stimulating and exhilarating transition in the evolution of mankind. We have reached the limits of the effectiveness of the attitudes, values, and world view which have shaped /our actions toward every part of that world for the last few centuries – its natural systems, resources, economic and financial systems, cultures, communities, and spiritual relationships.

While the details of the world emerging from this transformation are not yet clear, we are far enough into the transition to grasp some of its major characteristics. One thing we have learned from what is emerging, and from previous historical transformations, is that this process will not be smooth. It will not be a steady transition from one set of attitudes, values and ways of thinking to another. Instead, this transformation will proceed in fits and starts, with major breakthroughs and progress, interrupted by regressions to less effective and productive ways of living and thinking. There will be no easily recognized point of transition as the demarcation between before and after. This transition is far too complex and touches too many dimensions of our lives for that.

Another feature emerging from the confusion is a better understanding of the limitations of our current dominant attitudes, values and world view. We have been seeing the signs of these limitations for 50 years or more, and now we are beginning to glimpse not only many more symptoms of these limitations, but also their interrelatedness in an increasingly dysfunctional paradigm.

Fortunately, many people are developing successful approaches for dealing with natural systems, utilizing and conserving resources, conducting financial transactions which produce a better economic system, cultivating the benefits of diversity, building more successful communities, and creating more nurturing personal and spiritual relationships. This is a great time to be alive. Few times in history offer the opportunity to shape our world's future as profoundly as we can in the days ahead.

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This shaping process begins with gaining an understanding of the systems we have put in place and why they no longer work. Every day it becomes more apparent that current conditions are undermining the social, economic, and environmental systems on which we depend.[2] Some have compared the situation to a sinking ship. In spite of the growing sense of urgency, our expanding efforts to become more sustainable have been more than offset by the consequences of unsustainable economics and population growth. As Denis Hayes, one of the founders of Earth Day, noted, "We've won a few (environmental) victories … but it has been forty years of fighting heroic battles…. Today, if you really take a look at global trends … it is very hard to find one of them in which we are not in far worse shape today than we were forty years ago."[3] The recent economic recession has accelerated the breakdown of these systems in many ways.

This worsening situation particularly impacts the effort to achieve sustainable economic development. Some organizations and businesses have been working on sustainable economic development for years, and they have achieved a number of successes. Nevertheless, as we struggle to recover from one of the country's longest and deepest economic recessions, there is a growing realization that we will not emerge from our current economic downturn by trying to restore the way things were before it began. What is more likely to emerge is a "new normal" that differs significantly from our previous economic, social, and environmental conditions. What might this "new normal" look like? The answer to this question will provide the context for responsible economic development initiatives from this point forward.

Exploring this question requires a basic understanding of several important characteristics of our current system. These include:

- The phenomenon of exponential growth and its implications for our economy,
- The concept of the carrying capacity of a finite system (e.g., the earth),
- The principle of an inflection point which marks the transition from exponential growth to a dynamic balance,
- The importance of cheap energy and its role in our economic system,
- Some of the compounding implications of climate change,
- The dynamics and limitations of our current financial system, and

[2] The "Relevant Trends to Inform Strategic Choices" white paper prepared for SEDI's 2010 Board Retreat documented many examples of these trends, as well as our growing awareness of their implications. This white paper is available on SEDI's web site www.SEDInaz.org under Publications.

[3] Quoted in Register, Richard, 2005: "Losing the World, One Environmental Victory at a Time," *Ecocity Builders Newsletter*, September, http://www.ecocitybuilders.org/September2005.html, pp 2-3.

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- The implications of these factors on how we can effectively respond to the opportunity of our time.

As we undertake this analysis of the factors influencing a transition to a "new normal" economy, we should consider that this analysis will reveal a possible or even likely scenario, but only one of our possible futures. While predicting the future is always difficult, it is never more so than in times of great uncertainty such as we face today. As a result, any analysis of current trends should consider alternative outcomes, with the stipulation that any such outcome must be a reasonable result of current conditions and trends, as well as consistent with the laws of physics. While we are bombarded by many predictions of our possible futures, most of them focus on a single issue, ignoring the interdependency of current conditions, or they posit continued growth and business-as-usual futures that are physically impossible on a finite planet.

This analysis will attempt to briefly describe current conditions and trends, and two possible futures – one that would result if we don't act or act ineffectively in the face of the unprecedented scale of our challenges (sometimes called a business-as-usual scenario), and the other a possibility for action that would result in a future more worth living.

While exploring these issues can be somewhat depressing, it is important that we understand the full extent of the challenges facing us, and the urgent need to transition from what we are doing. Maybe understanding the seriousness of the issues and what is at stake will be enough to move us past the helpless fear and confusion that currently overwhelm many, and create enough motivation to do what it takes to transition our ways of living and thinking to a new reality.

The timing of the coming changes is not clear. Some effects are already impacting us, ranging from extreme weather events, to increasing energy costs, and significant financial instability. More effects are likely in the next few years, while others may not happen for 10 to 20 years from now, or not at all. The outcomes of current trends are the result of changes in complex systems with multiple layers of interdependencies and tipping points which make timing predictions difficult. While the timing might be difficult, the general outcomes of our current path are defined by the laws of physics and biology, and are relatively clear.

The timing and severity of the changes that are coming also depend partly on what we do and when we take action. The uncertainties and the complexity of the systems and their tipping points suggest that the sooner we begin the more likely we will be successful, and the less severe the consequences will be. So we

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shouldn't panic, but we also can't afford to be complacent. The time for getting started is now.

Fortunately, there is a positive way forward. Although it is hard to imagine another way to live, particularly one that is fundamentally better than what we are used to, history has demonstrated these types of transformations are both possible and worth the effort. Mankind has not always lived the way we do now. Fortunately, our current way of life is not ordained nor is it inevitable. An increasing number of people are developing attractive alternative financial and economic systems, as well as ways to live in balance with the earth in robust, resilient, and nurturing communities.

One hundred and fifty years ago, when our country faced a similar critical transition from slavery to a new world of greater equality and the vaguely seen possibilities of the Industrial Revolution, Abraham Lincoln reminded us that to save ourselves and make the transition demanded of us by history, one of the things we must do is be able to throw off the constraints of our outmoded ways of thinking. He used the phrase "we must disenthrall ourselves", which eloquently captures the way in which our current reality holds us spellbound – unable to clearly imagine alternative ways of life that could be better. Lincoln's words say it best: "The dogmas of the quiet past are inadequate to the stormy present. The occasion is piled high with difficulty and we must rise with the occasion. As our case is new, so we must think anew and act anew. We must disenthrall ourselves, and then we shall save our country."[4]

The later sections of this paper look at the implications of this transition for economic development in a "new normal" economy, and the opportunities uncovered for strategic initiatives that could both mitigate the impact of some current trends, and adapt to those trends it is too late to change. These opportunities take into consideration the challenges we face, and they bring to light some exciting possible roles for organizations focused on sustainable economic development.

This paper began as a backgrounder for the board retreat of the Sustainable Economic Development Initiative of Northern Arizona (SEDI), held in June 2011. It has been revised based on a variety of subsequent discussions, and is presented as a foundation for a broader discussion with a more general audience in the communities of our region.

[4] Abraham Lincoln, "Message to Congress," December 1, 1862.

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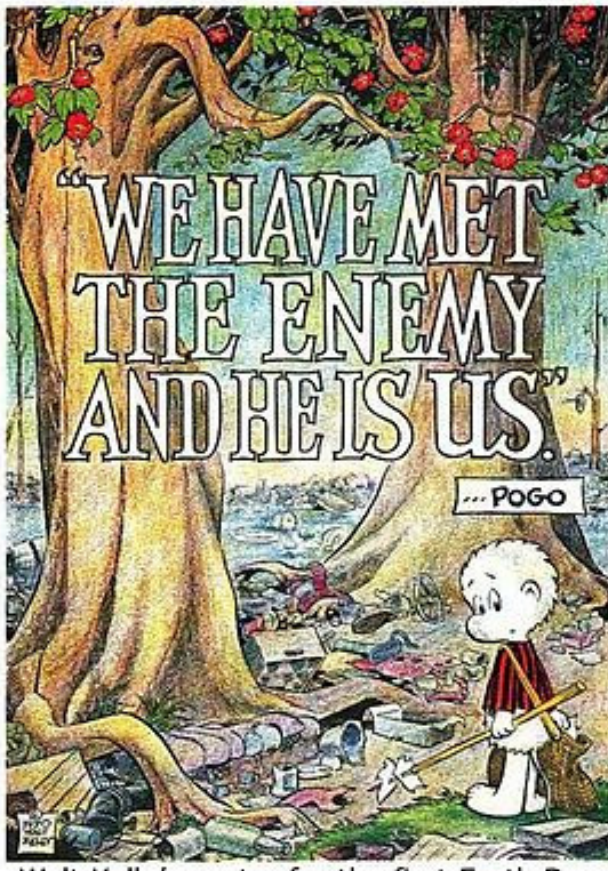
The Power of Exponential Growth



Walt Kelly's poster for the first Earth Day

Most of our economic and social systems are growing exponentially. This is important because exponential growth is a special type of growth, different than the more balanced growth of our bodies or the growth of a tree. Something that grows exponentially increases as a percent of its existing size rather than in fixed amounts, which is called linear growth.

An example of arithmetic or linear growth would be an account with $100 which increased by $10 per year. This account will reach $600 in 50 years. To see exponential growth, increase $100 by 10% each year. In the first year the growth is $10, the same as linear growth. In the second year the growth will be $11. Because of compounding, in 50 years the account will increase to almost $12,000. That's 20 times more than linear growth over the same period of time. The important point about exponential growth is that the absolute amount of each year's growth accelerates until it becomes larger than we expect or can easily imagine, with often unforeseen and unsustainable results.

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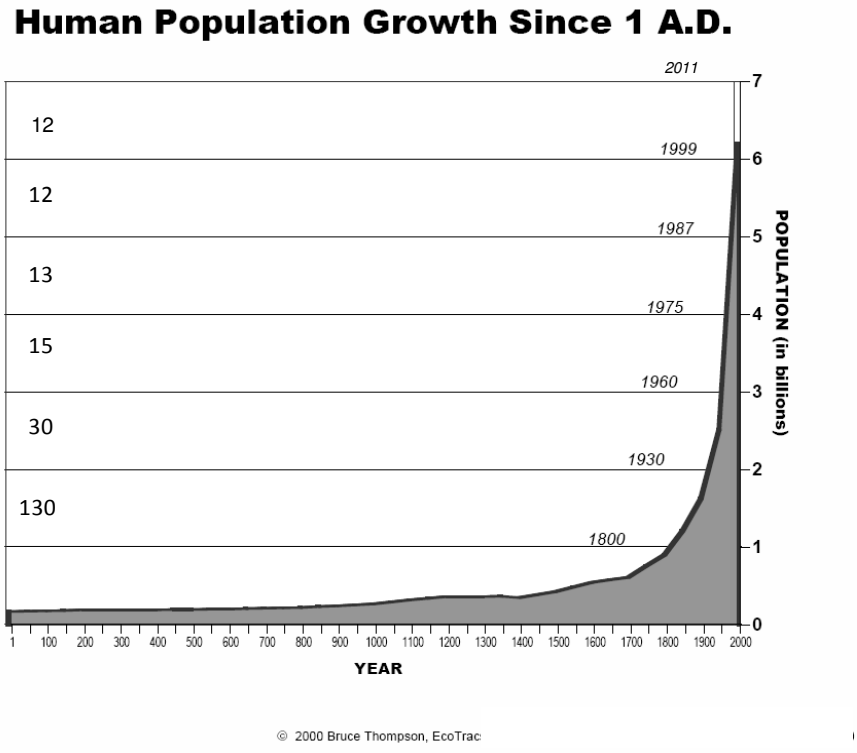
Using a children's riddle to say it more dramatically, if a pond contains one water lily, and the number of lilies doubles every day, and it takes 29 days for the number of lilies to cover half the pond, on what day will the lilies cover the entire pond? The answer, of course, is day 30. This often fools children to their great delight. The challenge is to realize how fast the daily growth in the number of lilies increases. While the growth in the first day is 1 lily, and the second day is 2 lilies, by the 10th day the increase is 256 lilies, and on the 30th day the increase is over 268 million lilies. This is a dramatic example of exponential growth.

Human population is growing exponentially. In fact, exponential growth is characteristic of the first phase of the exploitation of any resource. In the case of humans, exponential population growth has been created primarily by technological advances in food production and access to cheap energy. We are now outgrowing those resources, which will have profound consequences for our future. If we chart human population growth since the year 1 AD, we see what is called a "J" curve as in Chart 1 below. A "J" curve is the form in which exponential growth expresses itself. In other words, finding a "J" curve is a way of identifying exponential growth.

Chart 1: Population's Exponential Growth (J Curve)



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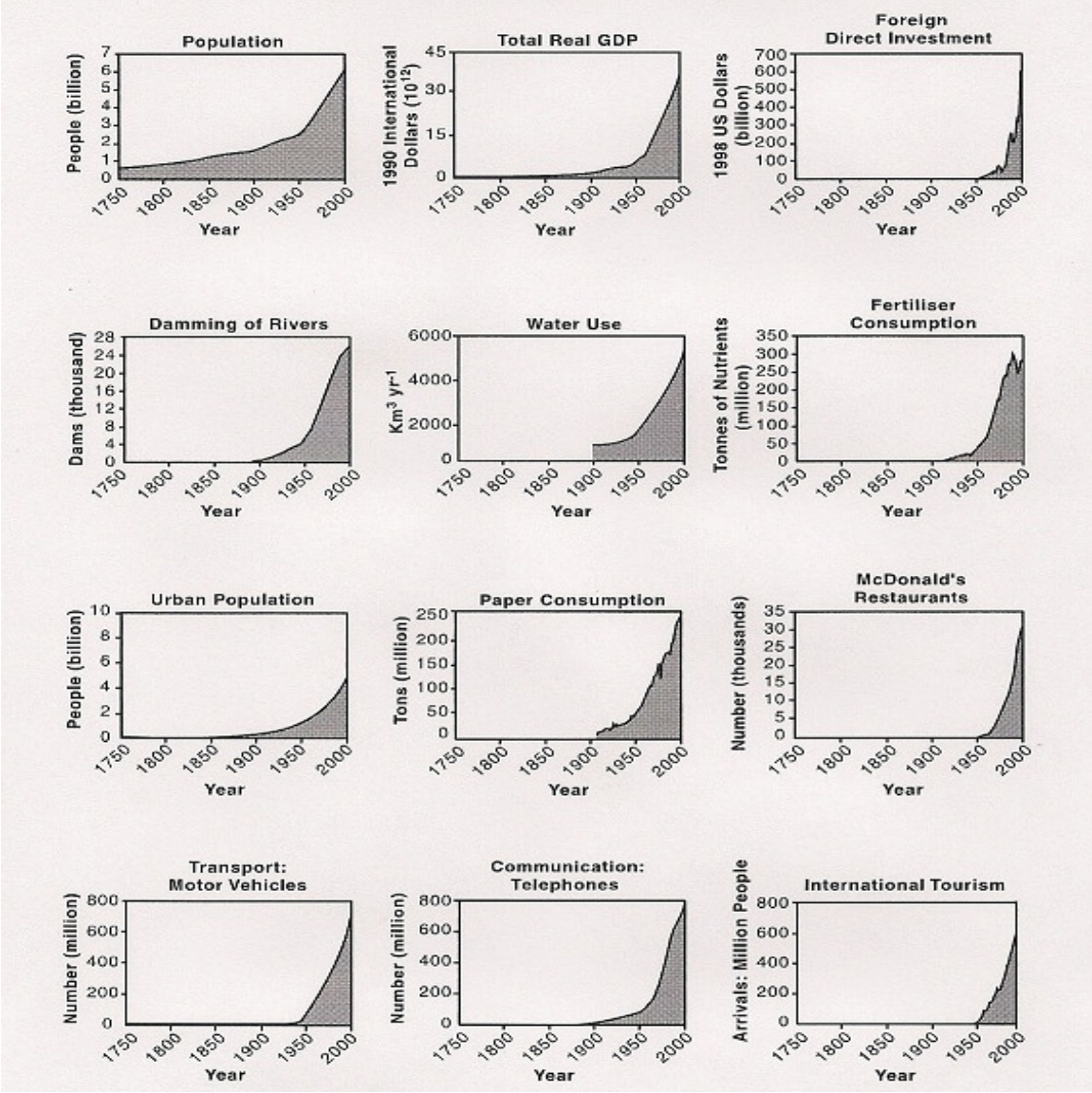
The exponential growth of the human population has created exponential growth in the use of all of the various resources needed to create and maintain that population's life styles. When we attach a financial value to these resources, their use and exchange is part of our economic system. Thus, it should be no surprise that our economic system is also experiencing exponential growth. Some of the other examples of exponential growth driven by the increases in human population are shown in Charts 2 and 3. Note the march of "J" curves across the pages.[5]

Chart 2: Other Examples of Exponential Growth (J Curves)



[5] These examples are taken from Steffen, Will, *et. al.,* 2004: Global Change and the Earth System, Springer Publishing, New York.

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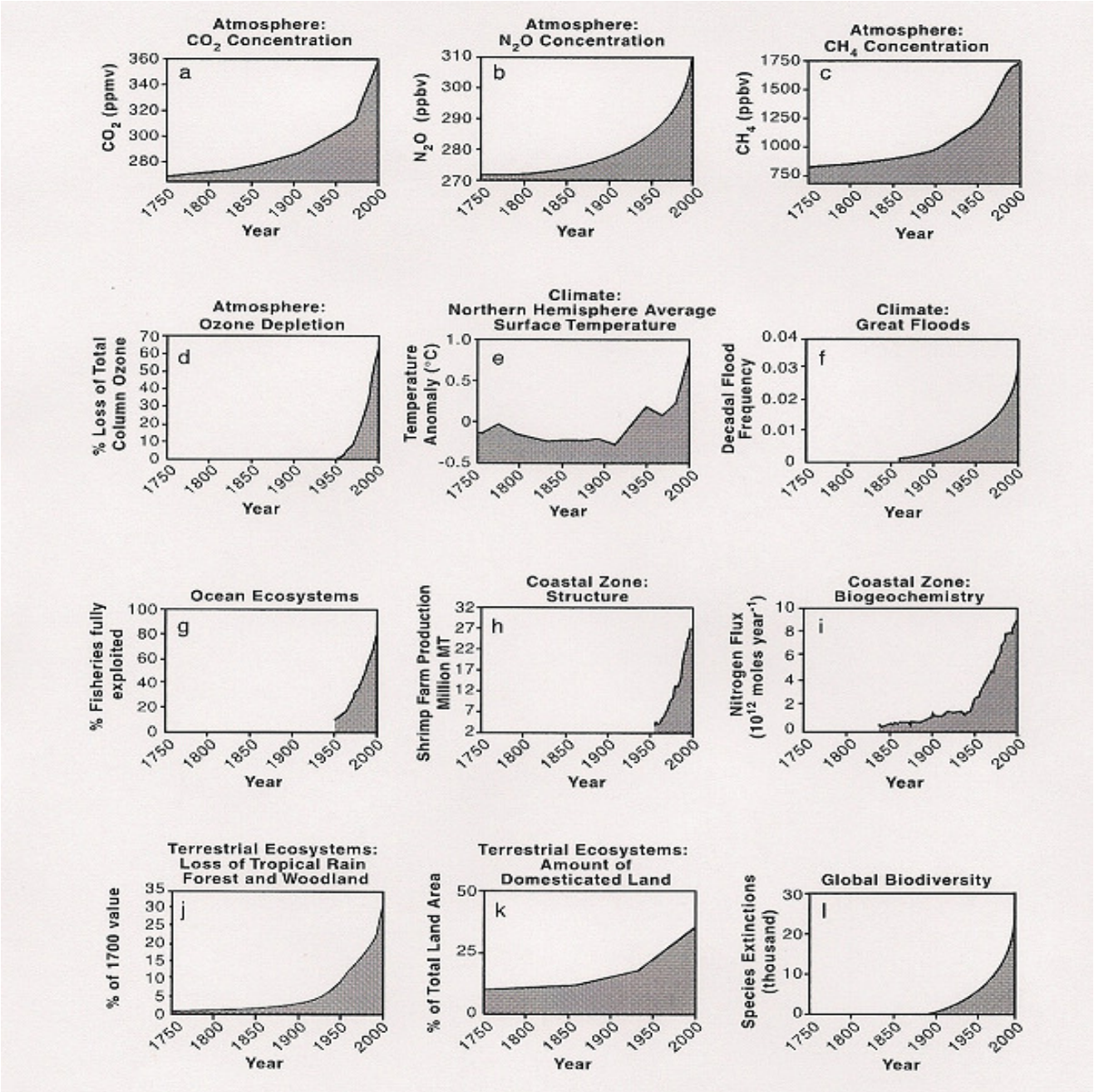
Chart 3: More Examples of Exponential Growth (J Curves)



The problem with exponential growth is that it cannot continue indefinitely in a finite system such as our earth. It is not sustainable. In a closed or finite system exponential growth runs out of the resources and the substitutes necessary to sustain that growth. One of the best known examples of exponential growth in a

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biological system is cancer. Early growth is either brought under control or excised, or it continues to grow exponentially until it kills its host.

As mentioned earlier, exponential growth is characteristic of the first phase of a system when there are resources not yet exploited. In the case of human populations these unexploited resources were the capacity to grow excess food, and relatively cheap energy. As we will see, we are reaching the earth's limits for our current model of food production, and we are exhausting our supplies of cheap energy. This means we are approaching the end of exponential population and economic growth.

As exponential growth approaches resource limits, it may slow down and morph its shape into more of an "S" curve (short for sigmoid curve). As population and economic systems become more in balance with the earth's carrying capacity, the resource utilization they drive will also become S curves in response. Alternatively, the momentum of exponential growth may carry the system into overshoot, i.e., beyond its sustainable carrying capacity. In an overshoot condition, the system consumes stored resources which may not be replaceable, with generally unwelcome consequences. The critical question for our way of life is how can we manage the transition away from exponential growth in population, food production, and cheap energy without crashing the economic system that supports human life as we know it?

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Carrying Capacity and the Limits of Exponential Growth

> *"Anyone who believes exponential growth can go on forever is either a madman or an economist."*
>
> Kenneth Boulding, Economist

Carrying capacity can be defined as the number of organisms a particular ecosystem or planet can support over a long period of time without suffering severe or irreparable damage. From a dynamic perspective, carrying capacity describes the maximum level of resource use that can be sustained by a system's pool of resources. A system's resource pool consists of stored resources (stocks), plus the growth in resources over time (in-flows), minus the use of resources over the same time period (out-flows).

In the case of petroleum based energy resources, for example, the stored resources (oil and gas reserves) are extensive; nature's additions to those reserves are negligible over the human time scale; and our use of those reserves over the same period is substantial. Most petroleum engineers agree that we have used approximately half of total world reserves of petroleum,[6] and the remaining reserves will be harder and much more expensive to find, extract, and refine.[7] As a result, petroleum production will begin declining in the years ahead, although demand is forecast to continue increasing. Without a global commitment to developing alternative energy resources at a much faster rate than we have seen so far, this is a formula for increasing energy prices, and declining economic growth.

In the case of our food supply system, we have relatively small stored reserves; we grow substantial but declining amounts of food each year; and the demand for food resources is increasing, driven by exponential world population growth. This is a fragile system trending toward increasing scarcity, higher prices, and the potential for substantial fluctuations in those prices based on the effects of extreme climate events on annual crop yields.

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[6] Here "reserves" is defined as those reserves already discovered (the sizes of which most experts agree are overstated), and an estimate of discoverable and recoverable reserves.

[7] This concept is referred to as "peak oil". It does not mean we are out of oil. It does mean that the amount of petroleum produced will be declining even though demand is expected to increase. The growing gap between supply and demand, plus the increasing costs of finding, extracting, and refining new petroleum reserves, will lead to increasing costs of petroleum products, e.g., gasoline, diesel, airplane fuel, downstream products such as food, plastics, fertilizers, and any other product dependent on petroleum-based transportation to reach its end users.

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Systems respond to resource limits, i.e., to the system's carrying capacity, in one of three ways. These patterns of transition are illustrated in the following diagrams.[8] All of them occur regularly in ecological as well as economic systems.

Diagram 1: Sustainable S Curve

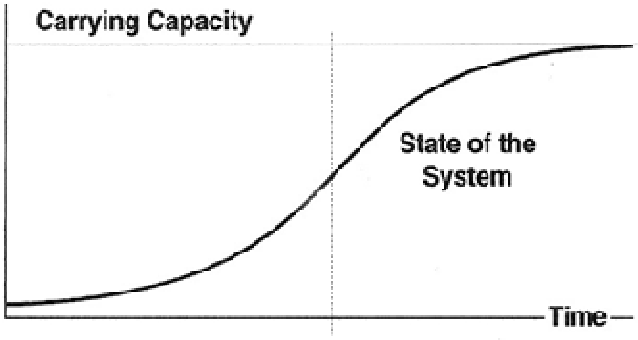


Diagram 2: Overshoot and Oscillation

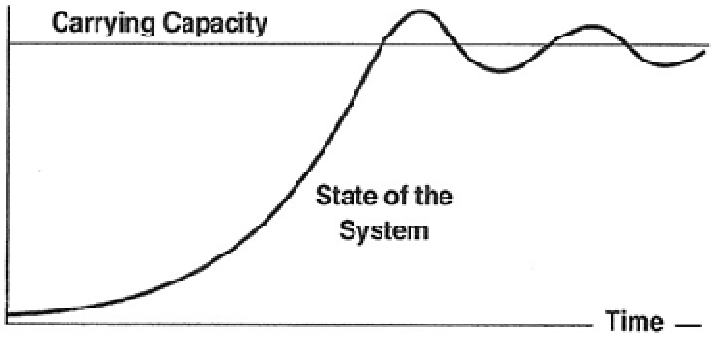
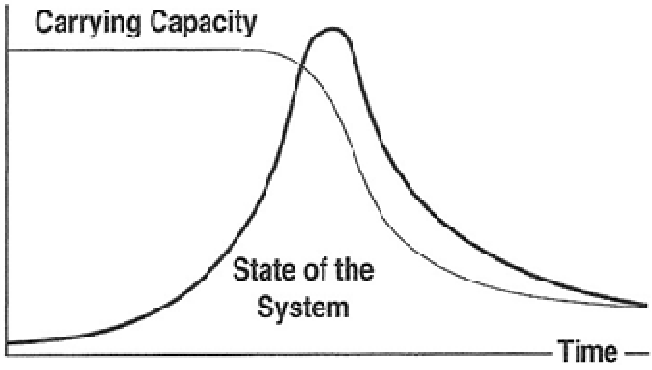


Diagram 3: Overshoot and Collapse



[8] These 3 diagrams are adapted from Sterman, John, 2000: Business Dynamics: Systems Thinking and Modeling for a Complex World, McGraw-Hill, New York, NY, pp 108-127.

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The overshoot and collapse curve in Diagram 3 no longer looks much like an S curve, but for a system in collapse, a sloppy S curve is the least of its worries.

One of the critical questions at this juncture in the growth of the human population system is how we manage the transition away from exponential growth in population, our economic system, food production, cheap energy, and our many other support resources.

Three factors determine how a system such as our economy will experience the transition from a J curve to an S curve as exponential growth reaches its capacity limits and responds to those limits. The factors which determine the type of response we will experience are:

1. The delay time for feedback on where the system is relative to its carrying capacity (e.g., economic production relative to the earth's carrying capacity, or CO^2 emissions relative to the earth's absorption and treatment capacity),

2. Our response time to this feedback (e.g., how quickly economic growth or CO^2 levels can be changed to get them back below carrying capacity), and

3. Whether the system's carrying capacity can easily recover from an overshoot, or is destroyed by it. In some cases a system's carrying capacity can be increased through innovations, resource substitutions, and/or better resource use strategies. These approaches can buy some time, but they are still subject to the somewhat expanded resource limits of the system.

Exponential growth in resource use can slow to a sustainable level when a system has timely and accurate feedback on its carrying capacity. If our response to that feedback is also timely and effective, then resource use can remain below or equal to carrying capacity. In fact, "maintaining resource use below carrying capacity" is a good definition of sustainability. This is illustrated by the sustainable S curve shown in Diagram 1 above. Notice that the growth rate declines from exponential rates to no net growth over time. This condition is more accurately thought of as a dynamic equilibrium in which the system responds to fluctuations in its resource limits.

If we overshoot our earth's carrying capacity, or have already done so, the consequences can take two forms, shown in Diagrams 2 and 3. The overshoot and oscillation response depicted in Diagram 2 occurs when there is a moderate delay in feedback about capacity limits allowing overshoot; when we respond relatively

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quickly to that feedback; and when the resource consumption during overshoot does not significantly use up or destroy the system's carrying capacity.

A common example is the oscillating dynamics in predator-prey relationships. In a coyote and rabbit ecosystem, for example, if the coyotes get wiley-er and eat more of the rabbit population, the subsequent reduction of rabbits available will cause a decrease in coyote fertility and an increased coyote death rate, reducing coyote population. The lower coyote population allows rabbits to flourish, and the following year there will be an abundance of rabbits. Increases in the availability of rabbits allows the coyote population to increase, perpetuating the oscillation of both coyote and rabbit populations.

Notice that the feedback on rabbit availability is relatively timely and accurate; the coyotes respond naturally and unemotionally in a timely way;[9] and, as long as the rabbit population is not completely destroyed, it can respond in a relatively short time to the reduction in coyotes. As long as the reproductive cycle is not undermined by overfishing, some fisheries can also be restored by an appropriate period of regulations controlling fishing. This is the strategy behind the Endangered Species Act.

Our population, economic, and many environmental systems, however, do not provide such clear and timely feedback. In addition, our identification of the earth's carrying capacity cannot be as clear as it is for the rabbit population in an ecosystem. Nevertheless, most scientists would agree that our economic and population growth are near or have already exceeded our earth's carrying capacity. We can reduce the risks of capacity overshoot by increasing the accuracy and timeliness of feedback on where we are relative to the earth's carrying capacity, and develop better ways of measuring that carrying capacity.

Some scientists have calculated that we have already overshot that carrying capacity by at least 30%.[10] This is likely to lead to an overshoot and collapse scenario. The overshoot and collapse dynamics shown in Diagram 3 occur under three conditions: 1) when there are relatively long delays in getting accurate feedback, 2) when there are relatively long delays in responding to that feedback,

[9] Of course coyotes near towns can substitute domesticated cats and small dogs as food sources, but that just establishes a new baseline for the total numbers of coyote predators, and rabbit–cat–small dog prey, marginally increasing the system's carrying capacity. The oscillation of predator-prey populations will adjust and then continue oscillating.

[10] Brown, Lester, 2009: Plan B 4.0: Mobilizing to Save Civilization, W. W. Norton & Co., London, UK., p 14.

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and 3) when too much of the carrying capacity is consumed during the delays, so that the carrying capacity of the system subsequently declines faster than the reductions in resource use.

If we have overshot the earth's carrying capacity as some suggest, achieving a sustainable economy would mean reducing economic activity until we can get back below carrying capacity, and then maintaining a dynamic equilibrium of economic activity. At the same time, the earth's carrying capacity is likely to be moving downwards for several reasons including: the impact of peak oil on the availability of cheap energy; reductions in food production because of soil fertility losses, reduced potable water availability, and the impacts of climate change; declining capability of natural systems to process the pollution and green house gas emissions created by human activity; biodiversity losses, and others.

A declining carrying capacity would make it even harder for economic activity to be reduced fast enough to become sustainable within our earth's reduced carrying capacity. So it is urgent that we begin reducing resource consumption as soon as possible. In our current economic paradigm, the resulting declines in our economic growth rates would be called a recession or a depression, triggering massive policy responses such as economic stimuli to reactivate growth. Under overshoot conditions, stimulating more growth would be exactly the wrong thing to do from a long term perspective. It would have only limited success and would consume increasingly limited resources at a faster rate, making the coming adjustment to get back within carrying capacity even more painful.

Remember also that one of the primary drivers of economic growth is population growth. If we are near or have overshot the earth's carrying capacity, an effective response would be a permanent decline in total population levels. While a combination of regional wars, food and water scarcity, or a disease pandemic might accomplish this objective in the short term, the emotional reactions to even the idea of declines in population levels make it unlikely the countries of the world would adopt the policies necessary to limit population growth over the long term. In other words, both our economic and population growth paradigms are driving us to overshoot the earth's carrying capacity. These growth paradigms also drive us to respond with difficulty and long delays even after we realize we are in overshoot. For example, the U.S. is not pursuing climate change policies even though atmospheric CO_2 is at 393.7 parts per million (ppm),[11] and some have determined the atmosphere's absorption limit (carrying capacity) is 350 ppm.[12] It seems even

[11] http://climateprotection.org.

[12] http://350.org/en/about/science.

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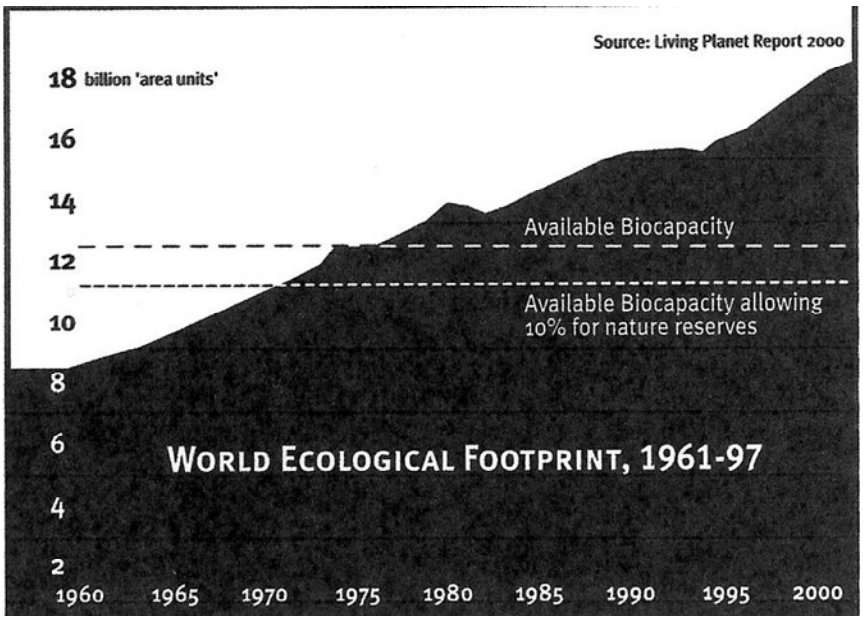
less likely that we will adopt the precautionary principle and limit economic and population growth in anticipation of a future overshoot of the carrying capacity of our finite earth.

One calculation of where we stand relative to the earth's carrying capacity is shown in Chart 4 below. Man's ecological footprint today is undoubtedly larger than is shown in this 1997 analysis. In this chart, available biocapacity is roughly equivalent to what we are calling carrying capacity. It shows we exceeded the earth's carrying capacity in the late 1970s.

Chart 4: Earth's Carrying Capacity - Ecological Footprint Analysis



This chart's estimate of the world's carrying capacity is consistent with several analyses that calculate the earth's population carrying capacity at between 4–5 billion people. Our world's actual population is expected to hit 7 billion sometime in the Fall of 2011. Getting below the estimates of the world's population carrying capacity will require significant population declines over many years at our current levels of economic activity and consumption. This will not be achieved by a policy of abstinence. If our resource demands decreased substantially, the earth's carrying capacity would have room for more people. This would probably require negative economic growth for some time.

Another perspective on where we stand relative to critical system thresholds comes from an analysis of nine planetary boundaries (or carrying capacity limits) that,

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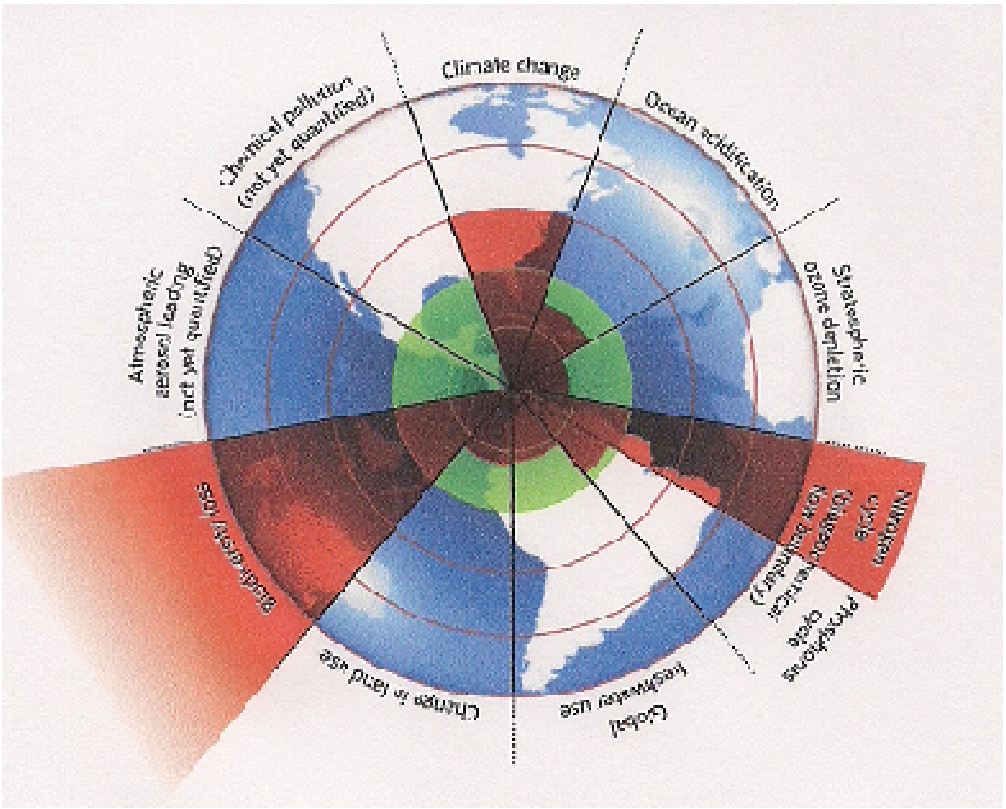
according to the authors, "should not be exceeded."[13] Diagram 4 presents a graphical representation of this analysis. The inner green shaded area represents the safe operating space for these nine planetary systems. Notice that we have already exceeded three of these planetary thresholds: biodiversity loss, climate change, and our disruption of the Nitrogen cycle portion of key biogeochemical flows. Our current status on two thresholds is not yet measureable.

Diagram 4: A Safe Operating Space For Humanity



Of course, carrying capacity can increase as well as decrease. For example, the earth's carrying capacity might increase a bit when an innovation allows us to grow more food without additional inputs of water, fertilizer, pesticides, herbicides or other petroleum products. In other words, we could feed more people without additional resources for food production. Taking waste out of the way we do things beyond agriculture also increases efficiencies and would increase carrying capacity. Some analysts list many ways in which we could reduce our resource use by four to

[13] Rockström, Johan, *et. al.*: "A Safe Operating Space For Humanity," *Nature*, Vol. 461/24 September, 2009, pp 471-475.

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more than ten times current levels.[14] From a full systems perspective, however, feeding more people with the same level of agricultural inputs doesn't mean we are using less total resources, since each additional person needs clothes, shelter, and a job which grows the economy and uses more overall resources. Also, Jevon's paradox[15] reminds us that production efficiencies often incent us to more production, resulting in comparable, and sometimes even more resource use.

In summary, current conditions suggest that we have already overshot the earth's carrying capacity, that many persist in denying the evidence of overshoot, and that we are not likely to respond in a timely and efficient manner once we do agree that there is a problem. The fact that population and economic growth are increasing resource consumption at exponential rates should reinforce our concern about further exceeding these limits.

Some might ask, if we have exceeded earth's carrying capacity, why have we not seen any significant consequences? Perhaps we have started to see these consequences, but have not yet connected the dots. Symptoms of existing problems with resource limits include:

- 1.2 billion people already do not have clean drinking water
- By 2025, 67% of the world's population will not have enough water to drink
- Regional conflicts over water are starting (e.g., over the last two decades China has built 20 dams on the three major rivers flowing into Southeast Asia. They are planning to build another 40 dams. Southeast Asian countries are protesting this potentially devastating loss of this water.)
- 20% of the world's population live on less than $1 per day
- The UN's food price index is the highest it has been in the 20 years data has been kept
- Marine ecosystems, source of more than half of the protein consumed by humans, appear to be on the verge of irreversible catastrophic collapse
- 175 million people in India, and 130 million in China, are being fed by crops watered by aquifer water pumped faster than it can be replaced. How will they be fed when the water runs out?

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[14] See von Weizsacker, Ernst, Amory Lovins, and Hunter Lovins, 1999: Factor Four: Doubling Wealth, Halving Resource Use, Earthscan Publications, London, U.K..; and Hawken, Paul, Amory Lovins, and Hunter Lovins, 1999: Natural Capitalism: Creating the Next Industrial Revolution, Little Brown and Company, Boston, MA.

[15] In 1865, the English economist William Jevons observed that technological progress that increases the efficiency with which a resource is used tends to increase (rather than decrease) the rate of consumption of that resource. We use more because it is cheaper or there is more available.

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- Energy prices are increasing in a pattern consistent with peak oil, and are contributing to economic recessions
- Advancing deserts and wells drying up have forced the abandonment of 24,000 villages and their croplands in Western China
- Soil erosion has reduced the productivity of the world's cropland by 30%
- Countries which have exceeded their land and water resources are buying land for agriculture from poor countries around the world.[16] Consequences include destabilization of food prices, mass population displacement, and environmental damage.[17]
- Drug resistant diseases and the threats of global pandemics are increasing partly as a result of greater population densities and mutating germs
- Unemployment is at levels and durations not seen since the Great Depression
- Significant flooding and other extreme weather events are at historic highs
- The UN reports 42 million people were displaced in 2010 by climate-related mega-disasters, more than double the 17 million displaced in 2009
- The number of failed states has doubled to 8 in the 4 years ending in 2008

This list could go on for several more pages. In addition to not connecting the dots, there is another reason we may not yet have recognized the full consequences of our current state of overshoot. There can be substantial delays in the response time of large scale natural systems to overshoot. As mentioned earlier, some scientists calculate that carbon dioxide concentrations in the earth's atmosphere should not exceed 350 ppm. The current concentration of CO_2 in our atmosphere is 393.7 ppm. While destructive storms, tornados, floods, and other extreme weather events have increased, the delays in climate response times help explain why the level of climate disruption has not yet approached the estimates of the potential negative outcomes of climate change. In other words, we are still not seeing the full consequences of the green house gasses we have already released into the atmosphere. We haven't seen anything yet, and we are not slowing down.

Response times are delayed because of the ability of a system to stay in overshoot for some time by consuming resources stockpiled in earlier years. Examples include the use of any non-renewable resource stocks, such as petroleum reserves or fossil water from ice age aquifers, neither of which will be renewed in any time frame relevant to human civilization. Over 400 million people are currently being

[16] Land-buying countries include Saudi Arabia, South Korea, China, Kuwait, Libya, India, Egypt, Jordan, and the UAE according to Lester Brown, 2009, *op. cit.,* p 10.

[17] A new report from the Oakland Institute indicates almost 200 million acres were acquired in 2010, and hedge funds are now getting into the act. http://media.oaklandinstitute.org/special-investigation-understanding-land-investment-deals-africa .

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fed by over-pumping aquifers.[18] When these aquifers run dry, the human tragedy will undermine the countries involved, and strain whatever goodwill may remain between countries which are short on water and those with enough water remaining. Consuming resource stocks can allow a system in overshoot time to get back within carrying capacity, but consuming stored resources also increases the chance that the system will collapse before it can recover.

Does this mean we may have some time to get back below carrying capacity if we act quickly? Perhaps, but even if we did have some grace period, and even if we did have better information on the carrying capacities of the systems in which we operate, complex civilizations do not have a good track record of responding in a timely manner to significant environmental or economic threats. Anthropologist Joseph Tainter identified this problem in his study of the 18 complex civilizations that have developed over the history of mankind.[19] Every one of these complex civilizations overshot their carrying capacity, did not respond in time, and collapsed. One of the critical findings that came out of this research is that "people will rarely acknowledge that an accustomed way of life is unsustainable except in the face of prolonged, devastating failure."[20] To date, our lack of adequate responses to climate change suggests we have not yet learned enough from the history of other complex human civilizations that collapsed.

In summary, the system conditions that generally lead to overshoot and collapse include: a relatively long delay in getting accurate feedback on a system's carrying capacity; a relatively long delay in responding once feedback on the system's carrying capacity indicates it is in overshoot; and a decline of critical resources faster than resource use is discontinued. All three of these conditions are present today. While conditions indicate we are likely in overshoot in population levels, climate changing air pollution, water use and pollution, biodiversity losses, cropland fertility losses, and many other systems, a significant portion of the world's population and their leaders strongly resist the immediate actions necessary to get back within the earth's carrying capacity. The most obvious example is the debate about the reality of climate change in the U.S., as well as the failure to do anything

[18] Brown, Lester, 2009, *op. cit.,* p 14.

[19] The complex civilizations Tainter studied are: the Western Chou Empire, the Harappan Civilization, Mesopotamia, the Egyptian Old Kingdom, the Hittite Empire, Minoan Civilization, Mycenaean Civilization, the Western Roman Empire, the Olmec, the Lowland Classic Maya, the Mesoamerican Highlands, Casas Grandes, The Chocoans, the Hohokam, the Hopewell and Mississippian complexes of North America's Eastern Woodlands, the Huari and Tiahuanaco Empires, the Kachin, and the Ik.

[20] Allen, T.F.H., Joseph Tainter, and Thomas Hoekstra, 2003: Supply-Side Sustainability, Columbia University Press, New York, NY, p 150.

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meaningful about it at the national policy level. Doing something about any of these areas of overshoot ultimately requires we decrease population levels and economic activity, which we have so far shown an unwillingness to even seriously consider.

There is some good news on population growth. The aging of the world's population, and the growing education of women, are reducing the global population growth rate. In some countries growth rates are now below the rate necessary to maintain current population levels. Some argue that if all women had access to birth control and family planning education, we could reduce world population growth to below the replacement level.[21] A transition to a dynamic equilibrium economy would reduce the demands on resources, increasing carrying capacity so that the earth could support a larger population. Nevertheless, the rate of increase in global population is still exponential today, even though the rate of increase has declined in a few countries in recent years.

The bottom line is human population levels as well as the many other areas in which we are in overshoot WILL be brought to within carrying capacity, even if that carrying capacity is dramatically reduced from current levels. Either we do the best we can to make the necessary reductions and adapt to the resulting changes, or the earth's natural systems will do it for us. If necessary, Mother Nature's approach would not likely be as inventive or discriminating as we could be.

Chart 5, from the recent update of Limits to Growth, provides the best projections we have about the likely outcomes of taking a business-as-usual approach.[22] This update and other analyses indicate the relative accuracy of these projections made 30 years ago. CSIRO, Australia's Commonwealth Scientific and Industrial Research Organization, for example, concluded, "(Our) analysis shows that 30 years of historical data compares favorably with key features of the (Limits to Growth) business-as-usual scenario…."[23] In the chart of the results of this scenario note that by 2100 many measures of economic performance return to near the levels that prevailed a century earlier (in 1900), except available resources, which decline by over 75%.

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[21] Engelman, R., 2011: "An End to Population Growth: Why Family Planning Is Key to a Sustainable Future," *Solutions,* Vol 2, No. 3.

[22] Meadows, Donella, *et. al*., 2004: Limits to Growth: The 30-Year Update, Chelsea Green Publishing, White River Junction, VT, p 169.

[23] Turner, Graham, "A Comparison of the Limits to Growth with Thirty Years of Reality," *CSIRO Sustainable Ecosystems*, June 2008, Abstract.

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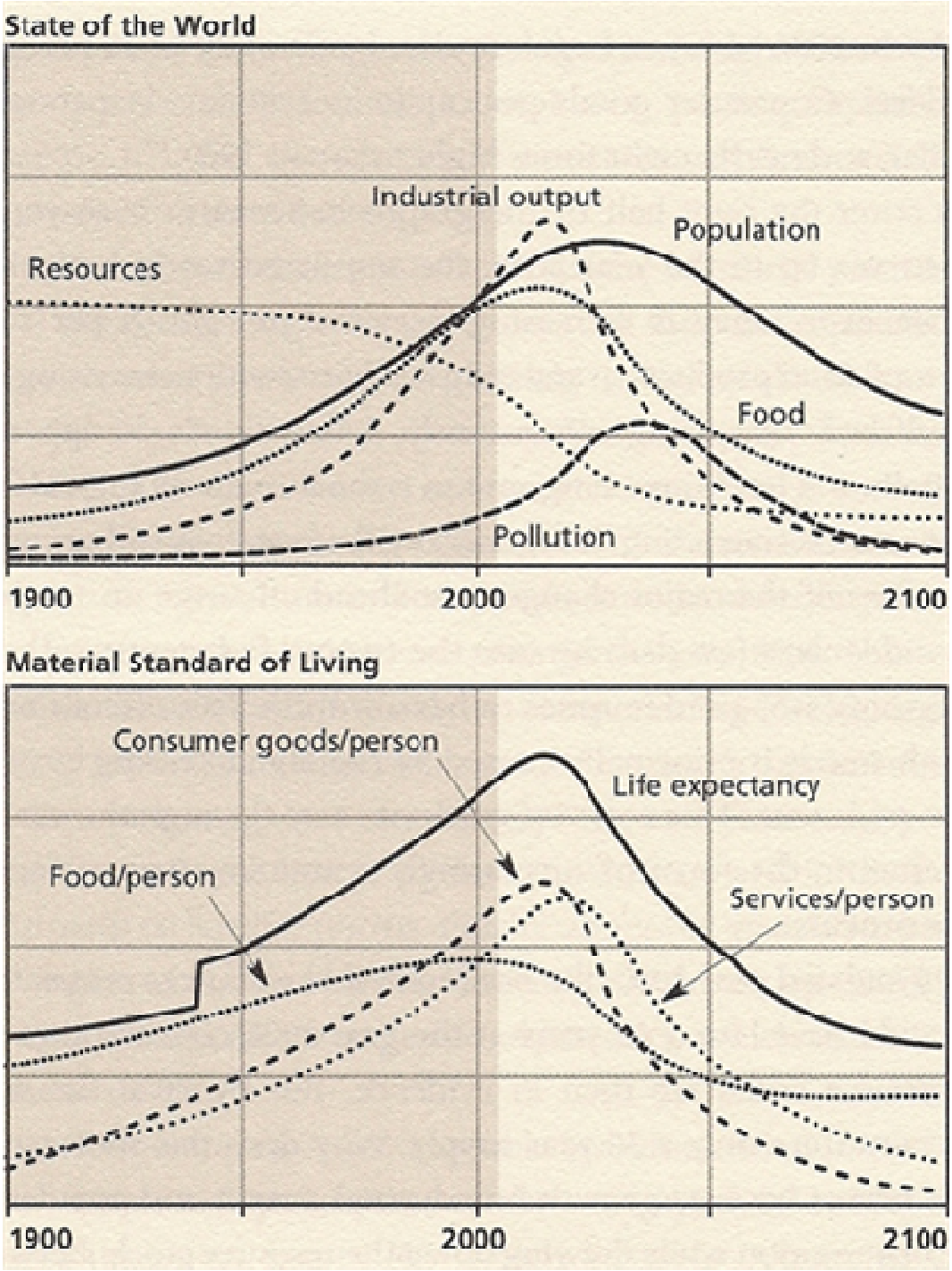
Chart 5: The Results of Business-as-Usual



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The good news is we have the ability to make accurate projections of the long term impacts of our policies. The bad news is we have had this information for over 30 years. During that time we have done almost nothing to prepare for the consequences of such a radical decline in overall economic activity. In addition, the implications of these projections were so potentially damaging to our leaders and politicians of 30 years age, and so inconsistent with our prevailing paradigms, that the original projections were distorted, taken out of context, and attacked viciously at the time they were first published.

These reactions are disturbingly similar to the current responses of many politicians and others to the science of climate change. Time has proven that these reactions to the bad news of the business-as-usual scenario were not only inaccurate and inappropriate, but that they also wasted precious response time. Today we have even less time to do something, and fewer options for what we can do. We may be too much like the 18 other complex civilizations that preceded us, which did not respond in time and collapsed.[24]

So time is of the essence. This urgency comes from both the short lead time remaining, and from our apparent lack of will to do what is needed. This lack of will is somewhat understandable when placed in the context of how substantial a shift in thinking is required by the transition from exponential growth to a dynamic equilibrium within our carrying capacity.

[24] Tainter, Joseph, 1990: The Collapse of Complex Societies, Cambridge University Press, Cambridge, U.K..

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Insights from the Inflection Point

An inflection point is the name for the point at which the progressive acceleration of growth (i.e., exponential growth) transitions to a phase of progressive deceleration, which hopefully levels out in a dynamic equilibrium with our system's carrying capacity. This transition at the inflection point is represented by the point where the J curve and S curve diverge (see Diagram 5, p 89), or the point where the dotted line crosses the S curve in Diagram 1 (p 17). While only a point on a graph, in practice this transition can be extraordinarily difficult and usually extends over an extended time period. On the opposite sides of the inflection point, the two phases of accelerating and decelerating growth differ in shape, and in many more important ways. These differences are so substantial in the cases of population and economic growth that this transition requires nothing less than a complete change in our values, attitudes, behavior, and world view.

For a person born in the phase of progressively accelerating growth, before the inflection point, the future appears to provide unlimited resources, including cheap available energy, to support population and economic growth.[25] For someone born after the inflection point, however, the future is characterized by multiple limitations with a ceiling on growth and expansion. Because of these differences, what is a positive value in one phase is a negative value in the other. For example, population growth in the first phase is valued, and provides survival as well as political and competitive advantages. In the phase of deceleration and balance, however, population growth threatens environmental system breakdowns and economic turmoil.

So it is not surprising that the emphasis in the first phase is on larger families, control of disease and premature death, while the primary values of the second phase are smaller families, and an enhancement of health and the quality of life. While persistent expansion in the first phase is appropriate given the availability of resources, a more dynamic equilibrium is necessary after the inflection point. Table 1 provides a summary of some of the different values and appropriate priorities that characterize either side of the inflection point.

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[25] The following discussion of the qualitative differences in conditions, outlook, attitudes, values and behaviors between the phases on either side of this inflection point is based on the excellent analysis provided by Jonas Salk and his son Jonathan Salk in their 1981 book World Population and Human Values: A New Reality, Harper & Row, New York, NY, pp 73-161.

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Table 1: Values in Transition at the Inflection Point

VALUES	ACCELERATING GROWTH PHASE	DECELERATING GROWTH PHASE
Health	Anti-Disease	Pro-Health
Population	Control of Death	Birth Control
Children	Quantity	Quality
Growth	Expansion	Dynamic Equilibrium
Economic objective	More is Better	Better is Better
Economic philosophy	Supply-side / Friedman	Ecological / Daly, Keynes
Goals	Maximization	Balance
Focus	Individual	Individual and Group
How to get things done	Power	Consensus
Survival strategy	Competition	Collaboration
How to be effective	Independence	Interdependence
Highest value placed on	Present	Present and Future
Perspective	Short-term	Long-term
Understanding based on	Parts	Whole
Decision matrix	Either / Or	Both / And
Paradigm framers	Newton	Einstein / Bohm

The process of transition from exponential to balanced growth, i.e., from one side of the inflection point to the other, is challenging and uncomfortable. Fundamental beliefs, attitudes, and world views are challenged and must be changed. We are being told that what has appeared to work well up to this point in history is no longer effective, and in fact, threatens our future. The resulting resistance, denial, strong emotions, and sometimes irrational reactions should not be surprising. Most of us today are still more focused on denying any facts that disagree with our belief system than we are in understanding the dynamics of our circumstances and following the data to their logical conclusions.[26]

Several other analysts have documented this unfolding transition. Some of the best examples are David Korten's book The Great Turning: From Empire to Earth Community; Peter Senge's The Necessary Revolution; Jeremy Rifkin's The Empathic Civilization; Fritjof Capra's The Turning Point; the New Economy Foundation's The Great Transition, and the work of Joanna Macy. They all identify this transition as a critical point in our human evolution. How we handle this transition will determine whether we become a failed experiment or we evolve to a new level of responsibility, effectiveness, and fulfillment. These authors also explore the difficulty of this transition – of giving up our ways of thinking and behaving for

[26] Mooney, Chris, "We Can't Handle the Truth: The Science of Why We Don't Believe in Science," *Mother Jones*, May/June, 2011, pp 40-45.

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another way of living. While this other way of living seems new to us, it has been proven to be a better way to live on the right side of the inflection point by millions of years of testing and refinement in the laboratories of evolution.[27]

This situation calls for a substantial majority of us to make a heroic transition – a journey that leaves behind our traditional views of how the world works and our place in that world, to create a new reality along lines with which we are not comfortable or very competent. This is the call to undertake the archetypal Hero's Journey described in chapter 15.

If we can complete this transition to the other side of the inflection point, we can create a new reality that is sustainable, i.e., operating within the world's carrying capacity. If we cannot achieve the critical mass of support necessary to make this transition, we risk overshoot and collapse. In the latter case, the destruction of critical resources could significantly constrain the future of what remains of humankind for centuries to come.

This is recognized not only by environmentalists, but also by successful business people. For example, Ray Anderson, CEO of Interface Carpet, noted, "Business and industry … must change their ways to survive…. By survive, I mean business must be steered through a transition from an old and dangerously dysfunctional model to a far better one that will operate in balance and harmony with nature – thrive in a carbon-constrained world, and put down the threats of global climate disruption, species extinction, resource depletion, and environmental degradation."[28] In other words, the world resulting from overshoot and collapse is not a good environment for business.

Joanna Macy summed up this moment of transition with the words, "Future generations, if there is a livable world for them, will look back at the epochal transition we are making to a life-sustaining society. And they may well call this the time of the Great Turning."[29]

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[27] Some discussions of the evolutionary effectiveness of this "new reality" for the dynamic equilibrium conditions on the right side of the inflection point include: Jenine Benyus' book Biomimicry; Chet Bowers' Revitalizing the Commons; Thomas Dietz's article "The Struggle to Manage the Commons"; Elinor Ostrom's Governing the Commons: The Evolution of Institutions for Collective Action; and the work of Daniel Quinn.

[28] Anderson, Ray, 2009: Confessions of a Radical Industrialist, St. Martin's Press, New York, NY, pp xiii-xiv.

[29] Macy, Joanna, "The Great Turning", http://www.joannamacy.net/thegreatturning.html.

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So a lot is at stake. These stakes are increased by the need to prepare for the impacts of declines in cheap energy. We are already seeing the signs of the petroleum production declines predicted by peak oil. The resulting increases in energy prices have been making a significant contribution to our economy's difficulty in recovering from its recession. We need time to make as many changes as possible to mitigate the downside risks, and to adapt to the changes we cannot avoid. We also need to act quickly because the longer we wait to deal with problems such as the declining availability of cheap energy, the more expensive that work will be, and the more expensive the money will be to pay for that work.

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The Importance of Cheap Energy

When new resources become available in any system, activities that can use those resources often grow exponentially until the new resources are fully utilized. The development of coal as an industrial energy source was a new energy source that supplanted wood and animal muscle power because it produced more power for less energy invested. In other words, coal provided a greater energy return on energy invested (EROEI) than wood or muscle power. This cheaper and more efficient energy source enabled the explosion of economic development called the Industrial Revolution. Oil and natural gas soon provided even more efficient energy sources, accelerating technological innovation and economic growth to exponential levels. This growth stimulated greater prosperity, increased food supplies and accelerated population growth. Our current levels of population and economic growth are dependent on this foundation of cheap, efficient energy.

Unfortunately, coal, oil, and natural gas are finite resources. Growing evidence indicates we are reaching, or have already reached, production peaks in all of these relatively cheap and high energy resources.[30] U.S. oil production peaked in 1970, and world production peaked somewhere between 2006 and 2010.[31] This means that additional production will be harder to achieve, will exhaust remaining resources faster, and will be increasingly expensive as the high quality, easy-to-access resources are exhausted and production turns to lower quality, harder-to-access and refine resources. In other words, the EROEI for remaining coal and petroleum reserves will be less than for earlier extractions. C. J. Cleveland calculated a greater than 100 to 1 EROEI for oil discovered before 1950, which dropped to a 30 to 1 return by the 1970s. The remaining lower quality, harder to reach domestic oil had a return of only 10 to 1 in 2000.[32] It is reasonable to expect similar declines in resource efficiencies from future coal and natural gas extractions. In short, the efficiencies of the energy resources that are the foundation of our current levels of economic growth will decrease, and prices will increase. How fast prices increase depends on how fast energy demand grows, and the speed of our ramp up of alternative energy resources.

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[30] A production peak does not mean we have exhausted these resources. It means current and rising usage levels reduce the pool of resources faster than new discoveries add to that pool. As mentioned earlier, at the peak we have used half of known and likely discoverable resources.

[31] Heinberg, Richard, 2010: Peak Everything: Waking Up to the Century of Declines, New Society Publishers, Gabriola Island, Canada, pp 1-14.

[32] Cleveland, C. J., *et. al.,* "Energy in the U.S. Economy: A Biophysical Perspective," *Science* 225, 1984, p. 890-897.

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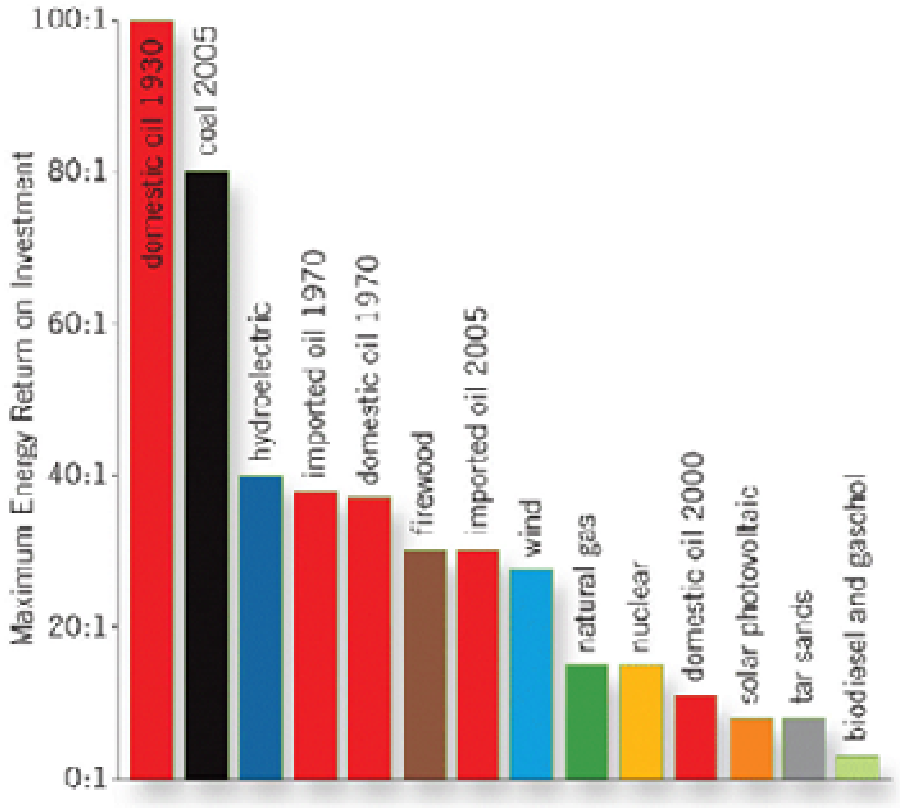
Investors are developing a wide range of alternate energy resources. Unfortunately, most of these energy sources have an EROEI well below that of coal and petroleum, or have other problems, such as high CO^2 emissions. Chart 6 shows a comparison of energy sources by EROEI.[33] Firewood, for example, shows a greater energy return than wind energy (primarily because it is easy to grow and harvest), but its large CO^2 emissions, limited availability, and the ecological impact of its harvesting makes it a less acceptable large scale energy source than wind.

Chart 6: Net Energy Comparisons of Some Energy Sources



For any energy source with an EROEI of less than 1, such as ethanol from some sources, it takes more energy to produce the ethanol than comes from using it as a

[33] Gulland, John, "How Much Energy Does It Take to Get Our Energy?," *Mother Earth News*, December 2010/January 2011.

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fuel. Any commitment to alternative energy that costs more energy that it produces is a waste of the investment of increasingly scarce cheap energy resources.

The reduced availability of cheap energy has many unwelcome consequences. Increasing energy costs, for example, will reduce economic activity and, therefore, our ability to reduce annual deficits and pay down national debt, meet social safety net obligations, and maintain our crumbling infrastructure (e.g., systems for transportation, waste water and water pollution treatment, potable water and energy distribution). The American Society of Civil Engineers, for example, estimates that the U.S. needs to spend $2.2 trillion over the next 5 years just to maintain our existing infrastructure.[34] It will cost even more to build the additional infrastructure capacity necessary to support our exponential population growth and deal with the impacts of climate changes. This estimate does not include the investments necessary to maintain or expand our systems of education, health care, food production and distribution, national security, and natural resources. All these costs will increase as the necessary energy becomes less available and more expensive.

In short, the reduced availability of cheap energy will have a self-reinforcing negative impact on our economy. This is a good example of the system effects which will reduce our economic growth in the face of resource limits if we do not do enough to put alternatives in place. So far sufficient commitment is lacking. This example also illustrates why it is so important to make substantial investments in alternative, renewable energy capacity before economic declines limit our ability to generate the necessary investment capital to do so.

[34] American Society of Civil Engineers, 2009: America's Infrastructure Crisis: Can We Come Back From the Brink, http://www.asce.org/uploadedFiles/Government_Relations_-_New/SCE34%205key_PDF_r01.pdf

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Climate Change Complications

Due to our refusal to live within natural limits, we now face a long emergency of rising temperatures and sea-levels, extreme weather events, as well as a host of related problems that will increasingly undermine or ability to maintain our growth levels. Climate destabilization – to which we are already committed – will change everything, and will prove the folly of those betting on quick technological fixes or minor adjustments in the way we live as adequate solutions to our challenges.[35]

For the past 12,000 years, Earth's stable climate has allowed human civilization to flourish. But this long, benign summer is an anomaly in the Earth's history and one that is rapidly coming to a close. The radical experiment of our modern industrial civilization is now disrupting our planet's very metabolism and our future hinges in large part on how the Earth responds. The greatest danger is not extreme yet discrete weather events, but profound and systemic disruptions on a global scale.[36] Contrary to the pervasive belief that climate change will be a gradual escalator ride into balmier temperatures, the Earth's climate system has a history of radical shifts – dramatic shocks that could lead to the collapse of social and economic systems. Some of those changes could develop quite rapidly. One example is the Younger Dryas Ice Age that lasted for about 1,300 years, and was recently calculated to have developed in less than one year.[37] The question is no longer how can we stop climate change, but how can we as a civilization survive it.

The demand for energy and its cost will further increase as growing climate change impacts require additional infrastructure investments to deal with extreme weather events, rising sea levels, food and water shortages, and climate refugees. In other words, the challenge of making the investments required to maintain our existing infrastructure and expand it to support our population and economic growth, is multiplied by the investments needed to mitigate and adapt to the growing impacts of climate change. And these investments will be required at the same time as the potential for negative economic growth undermines our ability to marshal the funding for these investments.

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[35] Orr, David, 2009: Down to the Wire: Confronting Climate Collapse, Oxford University Press, New York, NY.

[36] Dumanoski, Dianne, 2009: The End of the Long Summer, Crown Publishers, New York, NY.

[37] Ravilious, Kate, "Mini ice age took hold of Europe in months", *New Scientist*, 11 November, 2009.

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The Financial System Compounds

> *"The world economic system is held together largely by the belief and faith that it will grow. It's a confidence scheme, in the purest sense."*
>
> Richard Heinberg

Our financial system compounds these problems in several ways, including its use of compound interest. Our financial system remains quite precarious, in spite of the fact that many financial institutions are exceeding pre-meltdown levels of profitability and bonuses to their senior executives. Unfortunately, most of these profits are coming from taking low interest bail-out funds and Federal Reserve loans to arbitrage interest rates and speculate in commodities such as oil, instead of from making loans to businesses to help create jobs. The fact that financial institutions are doing so well when the rest of the economy is experiencing continued high unemployment, bankruptcies, and mortgage foreclosures should be a red flag that the system rests on shaky grounds and cannot be sustained. The financial system that emerges from the transition to a dynamic equilibrium economy will be as different as the economy itself.

The fundamental structure of our financial system provides an explanation of why that system cannot simply "recover" and return to its previous form. The primary long term weaknesses of our current financial system are based on two related characteristics. The first is the fractional reserve banking system which creates the money needed to support growth through bank lending – in other words through the creation of new debt. The second is the interest charges, which compound if unpaid, and the fees which accompany that debt.

Fractional reserve banking is relatively simple, although it sounds quite technical. In early financial systems, banks took in deposits and then lent some of that money out to be repaid with interest which would cover their costs and provide a reasonable profit. As the economy grew, businesses and consumers needed more money in circulation to support economic growth, so the Federal Reserve authorized banks to loan out more dollars than they had on deposit. In other words, the reserves to support lending were allowed to be only a fraction of the total loans outstanding, i.e., fractional reserve banking. This allowed banks to create new money simply by recording a new loan on their accounting ledgers, and allowed private banks to take over the government's role of increasing the money supply.

Initially each bank's total loans were limited to a few times the funds held on reserve. While conservative leverage (i.e., loans as a multiple of reserves) is

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considered to be total loans of 5 to 10 times reserves, the higher the leverage the more loans a bank can create, and the more interest income it can earn. More leverage also means more risk. More loans create more money in circulation, looking for profitable investments. If the economy is growing, there are many places to invest new money where the profit will more than cover the loan interest. As a result, banks have several incentives to create more loans. More loans mean more income to the bank from interest and fees, and those loans fuel more economic growth, which in turn stimulates the demand for more loans.

The Federal Reserve tries to manage money growth so that it will not fuel inflation, where more money is chasing the same investment and consumption opportunities driving up prices. Wall Street's creation of new financial instruments, such as securitization and derivatives,[38] for example, provide new investment opportunities for the money being created, so the risk of inflation is less. Unfortunately, these derivatives are often not backed by any tangible asset, so the default risks are higher at the same time as the growth potential is exponential.

The final restraint on the growth in the money supply came from breaking the link of money to the gold standard. As long as money was linked to a physical commodity, such as gold, the amount of money that could be created was theoretically limited by the amount of gold in the world's vaults. When money was decoupled from the gold standard in 1973, the demand for additional money to support exponential economic growth set the stage for the creation of unheard of debt levels, both public and private, and the potential for boom and bust economic cycles.

Recent years saw these various incentives for banks to create more money through more debt push bank lending to 30 or 40 times reserves, with the speculative fever of the real estate bubble and its many derivatives producing leverage of 100 times reserves or more. As a result, total U.S. debt, both public and private, has grown 350% faster than GDP between 1945 and 2010. While government debt has remained relatively constant as a percentage of GDP over that period, most of the debt growth has come from household debt and the financial sector.[39]

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[38] Securitization is the pooling of debt instruments (e.g., mortgages, auto loans, and/or credit card debt) into a new security which can then be sold to investors. Derivatives are an agreement whose value is determined by the price movement of some underlying asset, such as a financial security or commodities. The most common forms of derivatives are options, futures, and swaps.

[39] Heinberg, Richard, 2011: The End of Growth: Adapting to Our New Economic Reality, New Society Publishers, Gabriola Island, Canada, p 59.

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In addition to the structural problems in the financial system created by the dependence of economic growth on monetary growth enabled by debt, and the risks created by fractional reserve banking, all this money being created is fundamentally a call on labor and natural resources. Money's link to gold, when the gold standard was still in place, was a reminder of that call. At the same time as the money supply grows, driving economic growth and multiplying those claims, that growth is also reducing natural resources, and labor resources are not growing fast enough to make up the difference. At some time in the not too distant future, our remaining resources will not be sufficient to satisfy all the claims being created. This may not be an issue, however, since our current mountain of debt may well be rendered worthless before we run out of resources.

Interest on the debt being created is the second structural weakness of our present financial system. Our ability to pay the interest on the money we borrow is dependent on economic growth. We need growing incomes, or investments which produce financial returns faster than the interest accrues, just to cover the interest costs on the debt we create. If the economy is not growing at least as fast as the average interest rate on our debt, part of the interest payments will have to come from our savings, or we have to allow the interest to become principle, creating compounding and an exponential increase in our debt obligations.

If the need to get below our carrying capacity shrinks our economy into negative growth, and then holds it in a dynamic equilibrium with our carrying capacity, there will be no economic growth to generate the profits to pay the interest on our debt. As a result, most of our current debt will decline substantially in value. As this write-down unfolds, banks will also have to write-down or write-off the large amount of mortgage related derivatives on their books which they have put off valuing because they claim their value is uncertain. In the face of these challenges, many major banks could fail and confidence in our existing financial system could collapse. A relatively small event may be enough to trigger this collapse, such as the Lehman Brothers bankruptcy, which almost brought down our financial system in 2008.

Greece may well be the canary in the coal mine for future banking failures. The Greek economy was hit hard by the global financial downturn in 2008. By 2009 its budget deficit, predicted to be around 2.5% of GDP in early 2008, had increased to 13.5%. This precipitous increase in the budget deficit was the result of both declining economic activity, and the new government's discovery that the previous government had conspired with several international investment banks to hide budget deficits with loans that wouldn't be counted on the nation's books. Since

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the EU has a deficit limit for member countries at 3% of GDP, Greece's 13.5% deficit triggered close scrutiny by EU regulators and the financial community.

One of the problems is that Greece has created many tax loopholes, and special tax exemptions for businesses and rich citizens. Also, in addition to its traditional economy, Greece has a shadow economy in which participants do not pay taxes on normal economic transactions. This shadow economy is estimated to be as much as 40% of GDP. EU regulators calculated that if all taxes were paid that should have been paid, and special exemptions and tax credits eliminated, the Greek budget would be balanced.

When the off-balance-sheet debt was discovered and included, Greece's debt to GDP ratio for 2009 was 127.1%. For comparison, the total EU debt to GDP ratio was 73.6% for 2009. With the highest ratio of debt to GDP in the EU, and rising annual budget deficits, Greece was in danger of defaulting on its debt. EU ministers offered enough additional financing to cover immediate debt payments and maturities in 2010, but the deal required significant austerity measures including severe cuts to social services, and reductions in civil service salaries.

By 2011, these austerity measures left Greece's annual deficit a still hefty 10.5%, its unemployment rate is now 16%, and inflation is at 6%. To make progress on its debt, the Greek economy would have to grow faster than the amount of its interest payments, but instead of growing Greece's 2010 GDP declined by 4.5%. As a result, interest remains unpaid and is added to the loan principal, interest costs increase, the growth necessary to recover is undermined, and Greece begins a financial death spiral. It seems that the austerity imposed by the EU regulators has been counterproductive.

Since Greece's economy was not recovering, and additional debt payments were due in 2011, the EU recently committed another round of bail-out financing for Greece totaling $157 billion, subject to additional austerity measures – doubling down on their failed bailout austerity measures of 2010. The additional austerity measures include more cuts to public services, pensions, and the social safety net, 30% pay reductions for civil servants, and the sale of $72 billion of the country assets such as the ports of Piraeus and Thessaloniki (prime Mediterranean real estate), the national lottery, Greek Telecom, the postal bank, and the national railway system. The response to these austerity measures has been large scale social unrest, with street demonstrations and property destruction. This is further reducing employment and driving GDP further down.

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Ireland and Portugal also received bailouts because of similar problems, with the total bailouts for all three countries in 2011 equaling $366 billion. Spain and Italy (the EU's third largest economy) are likely to also require bailouts. Everyone agrees that these bailouts and austerity measures will still not be sufficient, but the alternatives to more bailouts are not very pleasant.

The most popular option would be for Greek businesses and the rich benefiting from exemptions plus participants in the shadow economy to pay their taxes, but this is not likely to happen.

The other options are also problematic. These options include allowing a Greek default, or a debt haircut (i.e., a forgiveness of some significant portion of the debt). Over half of Greece's debt is held by the European Central Bank (ECB), and either a Greek default or a debt haircut would significantly weaken the ECB. Other European banks would also be impacted, which could trigger a crisis of confidence in global financial markets which would be much harder to contain than the bankruptcy of Lehman Brothers.

So the growth of debt far faster than the exponential growth in GDP or population has produced national and global debt levels plus interest which may never be repayable. A recent McKinsey Global Institute report bears the title "The Era of Cheap Capital Draws to a Close". Declines in economic growth, however, will make higher interest obligations even more difficult to repay.

After our 2008 recession was underway, a group of economists began to discuss their role in the economy. Nobel laureate Robert Solow concluded that their general impact may be negative: "Their successes probably added little or nothing to the efficiency of the real economy, while the disasters transfered wealth from taxpayers to financiers."[40]

The good news is that our current financial system was created relatively recently, and its design flaws and excesses can be undone. Many initiatives are underway to create local currencies that could reinvent our cash economy, and there are several ways in which governments can create money in the financial system without depending on banks to use their fractional reserve structure to create more debt. Some of these systems do not even require the payment of interest to be successful.

[40] Chomsky, Norman, "America in Decline," *Truth-out,* August 5, 2011, see: http://www.truth-out.org/america-decline/1312567242.

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Before we explore these opportunities, we must first consider the possibilities that technology innovations and process improvements can create enough efficiencies that we can continue at least some growth in a finite world. Efficiencies increase carrying capacity, so if we can get enough efficiencies in resource use we should be able to achieve at least some growth in a dynamic equilibrium economy.

We should also be clear that when we describe a dynamic equilibrium economy we are referring to the world economy as a whole. Within that economy there will always be relative growth in one business, industry, community, or country relative to others, but total economic activity would remain within carrying capacity. If carrying capacity can be increased this would allow some overall economic growth, but the trends in resource consumption make it more likely that economic activity would have to decline for many years before it could establish a dynamic equilibrium within our carrying capacity.

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System Dynamics Revealed

To review where we are, if we are in overshoot and continue to do exactly what we are doing now, even if there is no further growth in the human population or the world economy, the world in the latter part of this century will still be unfit to live in. We are seeing the first effects of this transition already, and the changes will establish a new normal, which will be unlike previous conditions. Of course, human activities are not holding at current levels – they are accelerating exponentially, and so too is the pace of climate disruption, biotic impoverishment, toxification, and many other breakdowns of our environmental, social, and economic systems.[41]

The challenge we face is to rein in exponential growth in population, economic activity and consumption, CO^2 emissions, soil fertility losses, pollution, loss of diversity, and many other areas of exponential expansion. If we do not, we will continue to exceed the earth's carrying capacity, and exhaust the resources on which we depend (e.g., cheap fossil fuels, minerals, and a stable climate). As a result, the dynamics of our environmental, social, and economic systems will shift in ways we may not anticipate or be able to control. Some of the evidence that these dynamics are already at work is listed on pages 23 and 24 – the evidential dots that people are starting to connect.

Many would argue that we can maintain economic growth without negative environmental impacts by increasing economic efficiency through technology innovation and process improvements so that fewer resources are required for each unit of economic growth. This is called the decoupling of resource use from economic growth. Relative decoupling, or reducing resource use so that it grows more slowly than the economy grows, is valuable because it reduces environmental impacts below what they would have been. This would increase our carrying capacity. But this is not sufficient. Resource use would still be growing exponentially, just at a slower rate than the economy, and resources would still run out.

Absolute decoupling requires reducing renewable resource use faster than our economy grows, so that economic growth would not require any growth in renewable resource use. Non-renewable resource use would have to be reduced to a level at which those resources would not be used faster than renewable substitute could be found. This would be necessary to have economic growth continue in a

[41] Speth, James, 2008: The Bridge at the Edge of the World: Capitalism, the Environment, and Crossing from Crisis to Sustainability, Yale University Press, New Haven, CT.

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finite world. In a detailed analysis, Tim Jackson finds only limited evidence of relative decoupling, and only in some countries' use of only a few resources.[42] Also, to be effective technology innovations would have to increase economic efficiency faster than the growth in population and peoples' level of affluence (the driver of consumption). There is no historical evidence technological innovation can grow that fast, particularly on a sustained basis.[43] Jackson concludes, "as an escape from the dilemma of growth, (decoupling) is fundamentally flawed."[44]

In the face of these many challenges, we should remember that we are not solely responsible for controlling exponential population and economic growth. Reductions in exponential population and economic growth will happen. If we don't do it, the dynamics of our population and economic systems will. Resource limits and the overshoot dynamics of our social, economic and environmental systems will inevitably bring exponential growth under control, one way or another, with or without our help.

Water scarcity, starvation, wars, extreme weather events, and drug resistant diseases are already reducing population growth. In addition, the potential for a second dip in economic activity before we have recovered from the last one, and the ultimate potential for a financial system melt-down, threaten to fundamentally restructure our economic and financial system. The question is, do we want to have any say in how this transition turns out? We can mitigate the timing and severity of the transitions, and develop adaptation strategies for the changes we cannot control, or we can continue to do our work in the same old way, come home and have a drink, watch television, and then go on a cruise. Unfortunately, our situation is far too dire for pessimism, and if we want any hope of being able to sit back and relax, or even check out, we are going to have to make sure we create a world in which that is a viable option.[45]

Fortunately, some people understand the implications of these dynamics and are taking action. This action includes examinations of the best ways to decrease economic and population growth rates, discussions about what a "new normal" might look like, and efforts to picture a future of dynamic equilibrium economics

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[42] Jackson, Tim, 2009: Prosperity Without Growth: Economics for a Finite Planet, Earthscan, London, U.K., p 76.

[43] Jackson, *op. cit.,* p 121.

[44] Jackson, *op. cit.,* p 76.

[45] A stimulating argument for the need for broad involvement for positive change is Derrick Jensen's essay, "To Live or Not to Live: The Danger of the Tragic Hero Mindset," *Orion*, May/June, 2011.

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that is positive as well as more nurturing and enjoyable than our current economic system. These pioneers are showing us the way, but it will take broad collaborative efforts if we are to be successful in changing our prevailing paradigm.

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What Does Sustainable Economic Development Look Like in a Dynamic Equilibrium Economy?

It's 3:23 in the morning and I'm awake
because my grandchildren won't let me sleep.
My grandchildren ask me in dreams
what did you do while the planet was plundered?
What did you do when the earth was unraveling?
Surely you did something when the seasons started failing
as the mammals, reptiles and birds were all dying?
Did you fill the streets with protest when democracy was stolen?
What did you do
once
you
knew? Drew Dellinger

With this background in place, we can now turn to the question of sustainable economic development. If growth in the size of our economy is not sustainable, what does sustainable economic development mean? This question implies we want to continue to have a growing economy (economic development), but to do so under sustainable, dynamic equilibrium conditions. Stated this way, the question seems hard to answer not because it is difficult but because it is nonsense. How can you grow without growing? It mixes thinking from both sides of the inflection point – something that will be hard to avoid for awhile, and to which we must be particularly alert. However, the motivation behind this question is good. It seeks to discover how to construct a dynamic equilibrium economy, what it would be like to live in such an economy, and how to manage the transition.

The first important characteristic of our situation is that it is the result of many interlinked systemic problems. The background issues we have reviewed to this point are some of the most complex of those interlinked problems. Transforming from a situation of systemic problems into a dynamic equilibrium economy requires making systemic changes on two different scales. One is a macro perspective, defining an appropriate role for national and global policy to facilitate a transition to the right side of the inflection point – to a sustainable balance of a new kind of economic development within our carrying capacity. The second takes a local perspective, looking at what we can do at a local level to mitigate the unwelcome impacts of this transition, and to adapt to the things we cannot change. These different scales require different types of systemic change.

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Any successful transition will require both of these perspectives. Restructuring the financial system, for example, will require a wide range of legislative, regulatory and policy changes that can best be accomplished at the national level. These macro level, structural changes should provide a common framework and enable local problem solving. Without a common framework, fragmented and inconsistent local solutions will inhibit rather than facilitate effective economic activity. But national directives that try to go beyond a guiding framework by implementing a set of one-size-fits-all solutions for all locations are rarely effective. Locally generated adaptations, customized to the requirements of the unique characteristics of each community or region, are much more likely to be effective and resilient.[46]

So let's start with some of the macro level frameworks needed to support the local customization of the solutions necessary for this transition.

Macro Level Structural Changes

At the macro level, the need for a steady-state economy is not a new idea born of recent economic problems, nor is it the dream of unrealistic, ultra-left ideologues. In fact, leading economists over the years have identified the need for, and practicality of, a steady-state economy. Some of those include:[47]

- John Stuart Mill, a founding father of economics, recognized the necessity and the desirability of moving toward a "stationary state of capital and wealth," which he noted "implies no stationary state of human improvement." In response to the excesses of the early Industrial Revolution, Mill believed "the economy should aspire to exist in a 'stationary state'…. The intelligent application of technology, family planning, equal rights, and a dynamic combination of a progressive workers movement with the growth of consumer cooperatives can tame the worst excesses of capitalism and liberate society from the motivation of conspicuous consumption."[48]

[46] This approach has proven effective for the management of ecological systems, as well as for broader environmental policies, and the implementation of participatory democracy. See Daniel Kemmis' work in Community and the Politics of Place, and This Sovereign Land: A New Vision for Governing the West.

[47] Jackson, *op cit.,* pp 122-123.

[48] Simms, Andrew, Victoria Johnson, and Peter Chowla, 2010: Growth Isn't Possible: Why We Need a New Economic Direction, The New Economy Foundation, London, U.K., p 118.

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- John Maynard Keynes, a founder of macroeconomics, foresaw a time would come when the "economic problem" would be solved and we would "prefer to devote our further energies to non-economic purposes."

- Herman Daly, previously a senior economist at the World Bank, makes a cogent case for the necessity and practicality of a steady-state economy, primarily in his books The Steady State Economy and Beyond Growth.

Adam Smith's 1776 book Inquiry into the Nature and Cause of the Wealth of Nations, one of the most influential economics books every written, helps us begin to construct an outline of an economic system that could work in balance with our carrying capacity. Smith, and those who helped to flesh out his ideas, described a democratic ideal of a self-organizing economy creating "an equitable and socially optimal allocation of society's productive resources through the interaction of small buyers and sellers making decisions based on their individual needs, interests, and abilities."[49] The assumptions underlying this self-organizing economy are:[50]

- Buyers and sellers must be too small to influence the market price,
- Complete information must be available to all participants, and there can be no trade secrets,
- Sellers must bear the full cost of the products they sell and incorporate them into the sale price,
- Investment capital must remain within national borders, and trade between countries must be balanced, and
- Savings must be invested in the creation of productive capital rather than in speculative trading.

But does transitioning to a steady-state economy mean we have to give up what we perceive to be the benefits of economic growth – benefits such as increasing material goods, more leisure, and a constantly improving standard of living? Does it mean more starvation in the world because we can't increase food production to feed growing populations? Will social inequity increase because there is less to go around? Will we have to trash the planet to avoid crashing the economy?

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[49] Korten, David, 2009: Agenda for a New Economy: From Phantom Wealth to Real Wealth, Barrett-Koehler Publishers, San Francisco, CA., p 29.

[50] *Ibid.,* pp 30-31.

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As in most cases of unacceptable choices (e.g., trash the planet or crash the economy), these dichotomies are false ones. The dichotomies seem real because they are based on our current ways of thinking about how the economy has to work. A resolution depends on 1) a careful analysis that reveals other economic options that have worked in the past and are working today in many experiments around the world, and 2) the will to move beyond a comfortable status quo that will ultimately destroy us.

Such an analysis soon reveals that making the transition to a steady-state economy involves taking a risk. As Tim Jackson notes, "Society is faced with a profound dilemma. To resist growth is to risk economic and social collapse. To pursue it relentlessly is to endanger the ecosystems on which we depend for long term survival."[51] If this dilemma is even recognized, it is virtually unacknowledged in city, state, national or global policy discussions, nor is it included in most business strategies. Perhaps this is because of the sheer magnitude and complexity of the challenge. But the direction we must take is clear. The choice is between a risk and a certainty. The risk is we might make mistakes in the transition to a steady-state economy. We can learn from those mistakes. The certainty is we will suffer ecological, social, financial, and economic system collapse if we continue with business-as-usual. We must take the risk.

Fortunately, we can reduce this risk. The transformation to a steady-state economy starts with changes in our social norms and our visions, our behavior, and our expectations about the behavior of those around us and those we choose to lead us. We can start making those changes by a careful analysis of the situation, a dialog of public voices and all those who make policy, and the development of a clear plan for action. In the absence of a robust public and policy dialog, we can at least start with a draft plan based on the economic analysis of leading thinkers, and the social experiments described by Gar Alperovitz, Paul Hawken, Michael Shuman, Herman Daly, John Cobb, David Korten, the New Economics Foundation, and many others working on the leading edge of these issues.

The first step in reducing this risk is to observe the distinction between the purely financial transactions of Wall Street, and the broader economy as a whole. Wall Street capitalism uses money to make more money, as opposed to the Main Street economy, which utilizes resources to meet the needs for products and services in communities. We can separate the economic activities of Main Street, which can be organized around the assumptions of Adam Smith's self-organizing economy, from those of Wall Street, which makes the questionable leap of asserting that a self-

[51] Jackson, *op. cit.,* p 187.

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organizing economy is the same as a free market economy, which can provide the most benefits to all citizens if it is unregulated or self-regulated. Over the last 40 years, frequent market bubbles, the systematic transfer of wealth to the wealthiest 1% of society, and the recent recession's destruction of over $4 trillion in financial wealth and counting, all reveal that Wall Street and its version of the economy is systemically incapable of self-regulation.

"In a true market system, democratically accountable governments provide an appropriate framework of rules within which people, communities, entrepreneurs, and responsible investors self-organize in predominantly local markets to meet their economic needs in socially and environmentally responsible ways."[52] This Main Street economy can become a dynamic equilibrium economy. If governments directly manage the money supply, instead of delegating that authority to commercial banks and the Federal Reserve, the Main Street economy could do without Wall Street, with all its excesses and greed.

Wall Street could then be dramatically restructured to reduce the risks to the economy, by: ending the fractional reserve banking system; managing the money supply through a federal system rather than through the private banking system's creation of debt; separating risky underwriting and investment activities from commercial banking; and restructuring financial services to support Main Street, which would include breaking up the major banks into state and local scale financial service institutions.[53] This would dramatically reduce economic risks and provide a strong start down the road to a steady-state economy.[54]

Beyond these structural changes to our financial system, the macro level economic system changes needed to achieve a dynamic equilibrium economy include:

1. distinguishing between quantitative and qualitative growth in the economy;
2. developing measures of economic activity that focus on what we value;
3. limiting the use of ecological resources, and establishing equitable access;

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[52] *Ibid.,* p 32.

[53] For more details on the structural changes in the financial system that are necessary to support a dynamic equilibrium economy, see David Korten's Agenda for a New Economy (Why Wall Street Can't be Fixed and How to Replace It), Richard Heinberg's The End of Growth, and the New Economics Foundation's Towards a Twenty-First Century Banking and Monetary System.

[54] Each country's financial system is somewhat different, so slightly different changes would be required in each country, but the IMF and World Bank have sufficiently standardized the financial systems of the world's developed countries for these systemic changes to apply to most other countries as well as the U.S.

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4. incorporating all directly related costs of goods and services, some of which are currently being externalized;
5. reducing consumption and breaking the belief in the links between consumption, self-esteem, and self-realization;
6. minimizing the impacts on unemployment of the transition to a dynamic equilibrium economy;
7. investing to build natural and social capital;
8. developing more appropriate alternative to hyperbolic discounting to help investments in social and ecological capital compete with financial instruments for competitive returns;
9. redesigning our system of taxation to eliminate taxes on what we want (e.g., income, jobs), and to tax what we don't want (e.g., pollution, non-renewable resource use, consumption); and
10. leveraging the potential of the business community

These are not all of the structural changes that will be required to complete the transition to an economy of dynamic equilibrium, but they will create sufficient progress to reveal the remaining structural changes needed. We will describe each of these structural changes in some detail before we cover the local initiatives that complement them.

While these recommendations are at the macro (i.e., global or national) level, they are critical to provide the enabling framework to support necessary changes at the local level. To accomplish our work for sustainable economic development at the local level, it is also import that we understand and aggressively support these essential national and global structural changes.

1. Quantitative vs. Qualitative Growth

One key component of the economic system being rethought is the way we measure economic progress. Quantitative economic growth is generally measured by gross domestic product (GDP), or the value of goods and services produced and sold in an economy. By this measure the world's economy grew more than 600% (from $5.3 trillion to $37.2 trillion) between 1950 and 2001, while population grew "only" 144% (from 2.5 billion to 6.1 billion) over the same period. While such exponential growth is not sustainable, economists argue it is necessary to increase society's satisfaction levels. Because satisfaction is hard to define, economists assume the price people are willing to pay for something is an adequate measure of its relative utility or the satisfaction it provides. Since GDP measures the total

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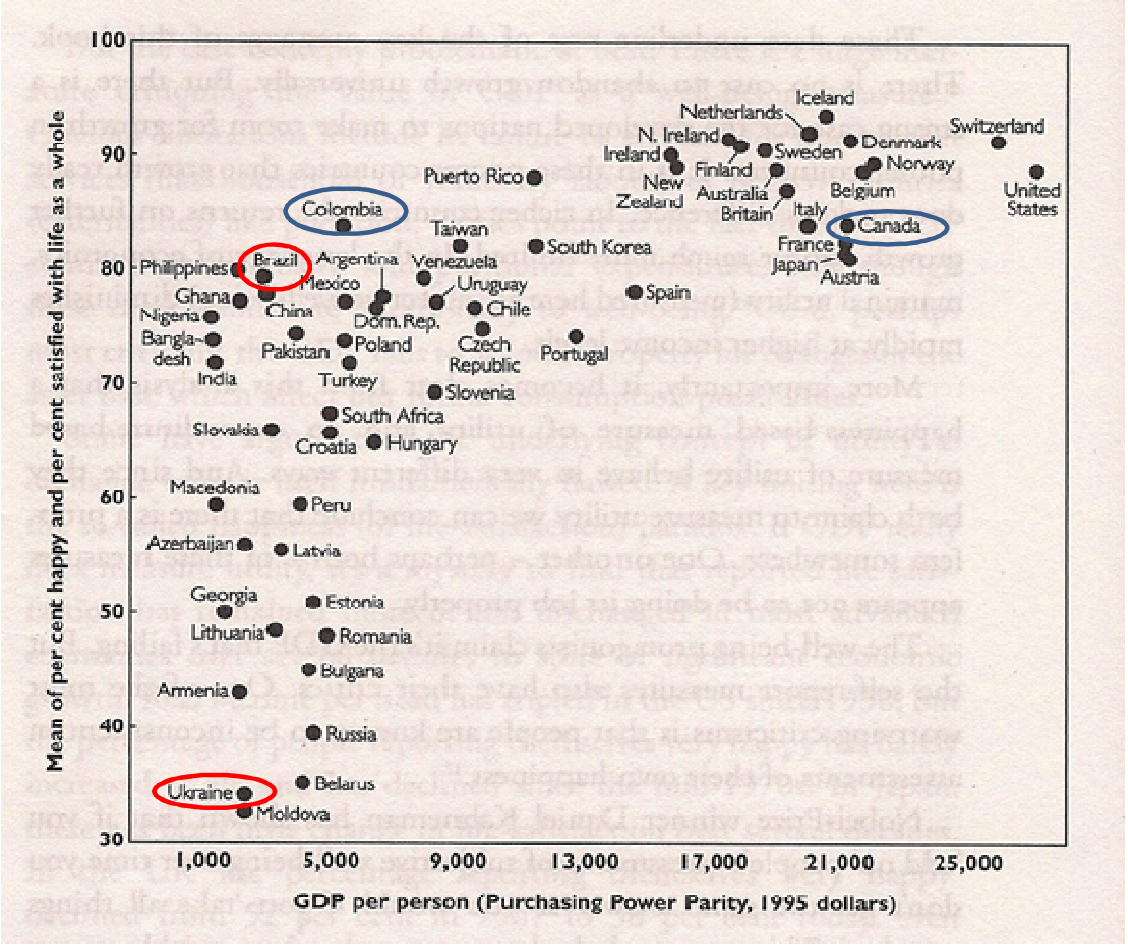
monetary transactions in an economy, economists see it as a surrogate for satisfaction, and growing GDP becomes a strategy for increasing social well being.

This argument for the necessity of quantitative economic growth is problematic. At the macro level, many studies show a disconnect between happiness or satisfaction with life and per capita GDP levels, once basic needs have been met. Chart 7, for example, shows that people in Brazil and the Ukraine experience a great difference in their quality of life without much difference in their income levels. Also large differences in economic activity levels can result in similar levels of happiness and satisfaction, as is the case for Canada and Columbia.

Chart 7: Quality vs. the Quantity of Economic Activity[55]



Similar disconnections exist between per capita GDP and the many benefits that are presumed to come from greater economic activity, such as longer life expectancy,

[55] Jackson, *op. cit.,* p 42.

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lower infant mortality, and greater educational opportunities and participation.[56] As in Chart 7, these measures also show that there can be big differences in satisfaction between high and low income levels, but the impact of income diminishes significantly with economic growth.

This suggests there must be another way of thinking about and measuring economic development that does not confront resource limits. Such an alternative perspective is based on the fact that development can mean growth in quality, and that quality is not necessarily linked to quantity. In other words, the experiences of many countries demonstrate that we can grow our quality of life without having to grow the quantity of our economic system or our material consumption levels.

For these reasons, over the last several decades economists and policy makers have expressed growing dissatisfaction with GDP as a measure of our well-being. As a result, many economists are developing alternative approaches to measuring what is more important in an economy than quantitative economic growth.[57]

2. Measuring Economic Performance

One of the approaches to providing another measure of economic progress is the Genuine Progress Indicator (GPI). This index is based on the fact that the GDP does not include non-financial transactions that we value, such as household work or voluntary labor. At the same time, GDP does count things that don't contribute to our well-being, such as the costs of crime, automobile accidents, and natural disasters. Robert Kennedy said it best when he reminded us:

> "Our gross domestic product counts (as growth) air pollution and cigarette advertising, and ambulances to clear our highways of carnage. It counts special locks for our doors and the jails for those who break them. It counts the destruction of our redwoods and the loss of our natural wonder in chaotic sprawl. It counts napalm and the cost of a nuclear warhead, and armored cars for police who fight riots in our streets. It counts the television programs which glorify violence in order to sell toys to our children. Yet the gross domestic product does not allow for the health of our children, the quality of their education, or the joy of their play. It does not include the beauty of our poetry or the strength of our marriages; the intelligence of our public debate or the

[56] *Ibid.*, pp 56-58.

[57] Gertner, Jon, "The Rise and Fall of the GDP," *New York Times Magazine*, May 13, 2010.

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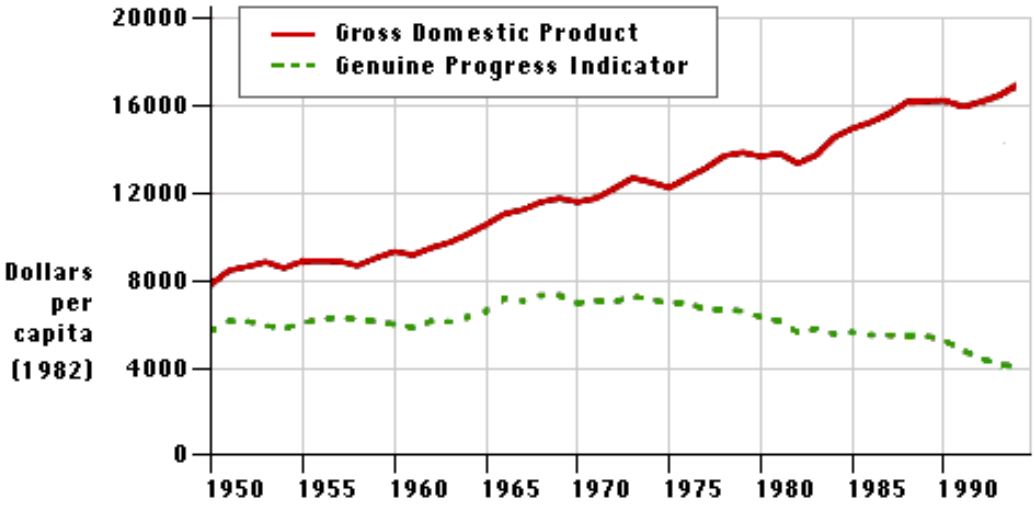
integrity of our public officials. It measures neither our wit nor our courage; neither our wisdom nor our learning; neither our compassion nor our devotion to our country; it measures everything, in short, except that which makes life worthwhile. And it tells us everything about America except why we are proud that we are Americans."[58]

Chart 8 below compares U.S. GDP with GPI, providing a clear demonstration that GDP does not measure social well-being. The chart shows that our formal economy measured by GDP has grown over the last 60 years, but our well-being as a society has actually declined. This raises the possibility of the reverse also being possible, i.e., our well-being could increase while our material economy does not grow. This is another way of saying that quantitative economic growth is not necessary for utility, or satisfaction, or well-being to grow.

Chart 8: A Comparison of GDP with GPI



Source: Cobb, Halstead, Rowe; Genuine Progress Indicator

In addition to the Genuine Progress Indicator, other credible efforts to create a more comprehensive measure of social, environmental and economic conditions include the World Bank's Net Savings Index, Nordhaus and Tobin's Measure of Economic Welfare, Daly and Cobb's Index of Sustainable Economic Welfare, the State of the USA measure, the Human Development Index, the Stiglitz-Sen-Fitoussi

[58] Robert F. Kennedy, Address at the University of Kansas, March 18, 1968 http://www.jfklibrary.org/Historical+Resources/Archives/Reference+Desk/Speeches/RFK/RFKSpeech68Mar18UKansas.htm

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Commission's Measurement of Economic Performance and Social Progress, and the Canadian Index of Well-Being. From these efforts we can develop a new set of national accounts as an appropriate measure of the performance of a dynamic equilibrium economy.

Since we pay attention to what we measure, measuring what we need to value on the right side of the inflection point will help us to make the transition.

3. Limiting Ecological Resource Use

Reducing the use of ecological resources helps bring the consumption of resources and sinks[59] to sustainable levels. This also slows the rate of quantitative economic growth. To the degree that this allows the same population to live productive, satisfying lives using fewer resources, reducing resource use increases the population carrying capacity of the earth. Any such increase in carrying capacity also depends on our being disciplined enough to avoid Jevon's paradox. As mentioned earlier, Jevon's paradox points out that increased efficiency in resource use is usually accompanied by an increase (rather than a decrease) in the consumption of the resource. Increasing auto gas mileage, for example, could easily result in driving more miles and/or driving faster and less efficiently because of the lower cost of doing so. We tend to use more because greater efficiency makes it cheaper, or because there is more available.

Limiting resource use can be accomplished directly through regulations or tax incentives, or indirectly through innovations in resource acquisition, processing, and use, or by demand reductions brought about by changes in social norms. Efficiency innovations produce a relative decoupling of resource use and economic growth. The hope is that this would allow economic growth to increase without having as much impact on resource use. However, as mentioned earlier, Tim Jackson has found virtually no examples of such decoupling being successful in reducing resource use on a large scale.[60] Substitutions of one resource for another may reduce the use of one resource, but offsets it by the increased use of anther. As a

[59] A sink is a natural system which absorbs, stores, and processes waste or pollution. For example, a wetland can capture water pollution, store it, and bioremediate the pollutants into harmless compounds. Our atmosphere and our oceans capture carbon dioxide, store it, and process it into different compounds over time. As such, these and many other natural sinks are resources which are used up when they run out of absorption and storage capacity. These sinks are critical to ecosystem health and must be preserved as much as any other resource.

[60] Jackson, *op. cit.,* p 121.

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result, limiting resource use will probably have to combine efficiency innovations with tax or regulatory incentives if we are to be successful in reducing the rate of economic growth.

Some analysts[61] argue that to reduce resource use all the way to levels below the earth's carrying (a reduction of perhaps 30%), we will have to establish a regulatory regime to set hard limits on the global use of various critical and non-renewable resources and sinks. These limits would start at a reasonable level, then be reduced over time to carrying capacity, which would allow us time to adjust.

Setting such limits immediately raises the question of how access to these restricted resources will be apportioned. Equitable access issues are also raised by our current system of access rights defined by which resources happen to be found in which countries, and who has the money to capture and control those resources. Equity considerations require reassessing these approaches to access. In the case of establishing resource limits, a more equitable access approach would be to apply these limits in the form of global per capita allowances.

Supporting equitable resource access in developing countries means the resource use in developed countries must decrease enough to allow room for some growth in developing countries. This model is known as contraction and convergence – the resource use is capped, and the cap is lowered over time contracting resource use so that it converges on a sustainable level. A hybrid of this approach is currently being used for carbon emissions under the Kyoto Protocol, although it is not working very well.

A steady state global economy does not mean that there is no growth anywhere. There will be relative growth, with some countries growing as others contract, so the growth in developing countries will need to be offset by reductions in the economic activity levels of developed countries to below sustainable levels so we can transition to a level of equitable access. So while there will be relative growth, the objective is a dynamic global equilibrium in absolute growth.

Some would argue that this is inefficient. They point out that some countries can use resources much more efficiently than others, and the world as a whole would be better off if the most efficient countries got more access to resources than the less efficient ones. This argument fails for several reasons. First, it assumes that efficiency is the only criteria appropriate for determining resource access. This is an assumption based on the values of exponential growth, on the left side of the

[61] For example, see Jackson, *op. cit*., pp 173-174.

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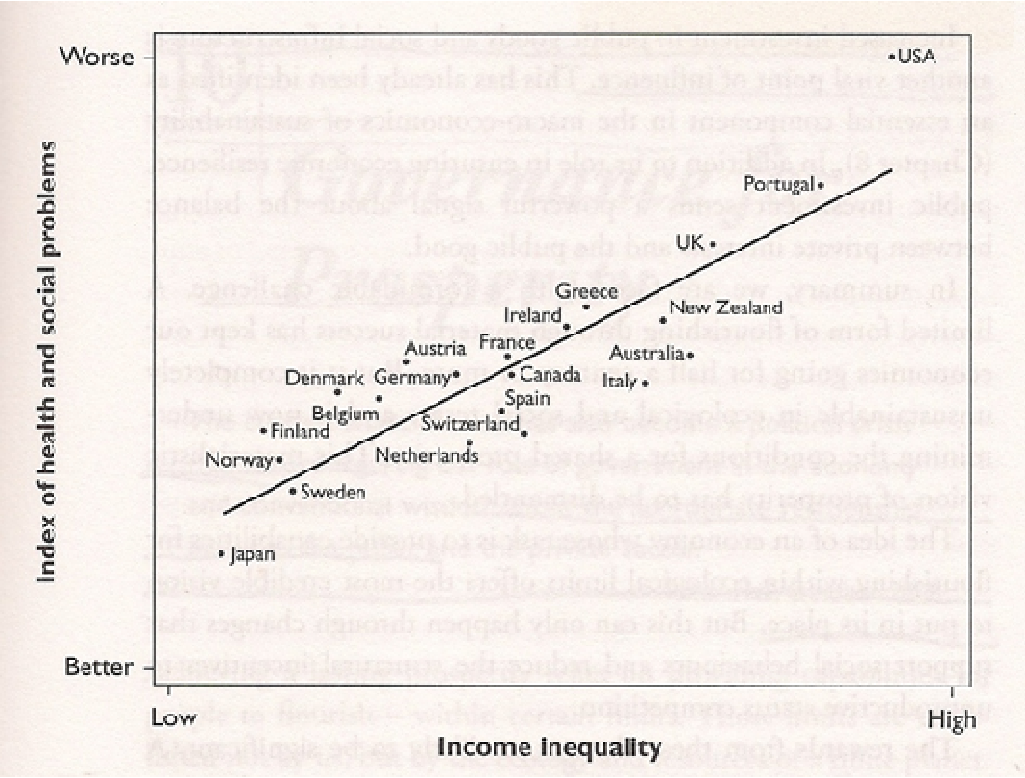
inflection point. These values are less appropriate to the transition of our economy to dynamic equilibrium. Second, relative efficiencies may change when we look at full cost pricing, including relevant externalities. Third, countries more efficient in resource use have developed a structural advantage that supports their greater efficiency. This makes it difficult or impossible for other countries to compete for these resources. Fourth, if countries with structural advantages get the limited resources, they are not likely to send the economic benefits of their structural advantage to the less efficient countries. The result would be the less efficient countries would lose access to the resources they need to develop their own greater efficiencies. So the rich get richer, and the developing countries never have a chance to catch up or provide a higher standard of living to their citizens.

Fifth, there is a high cost for the lack of equitable access, whether within a country or among countries. Several recent analyses looked at these costs. The results of the first study, shown in Chart 9, show that there is a strong correlation of inequality with health and social problems.[62] Note the USA's relative position.

Chart 9: Inequality Linked to Health and Social Problems



[62] Jackson, *op. cit.,* p 155. The health and social problems index (Y axis) includes: life expectancy, literacy, infant mortality, homicide, imprisonment, teenage births, trust, obesity, mental illness (including alcohol and drug addiction), and social mobility.

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The second study determined that if the U.K. had equitable resource distribution comparable to Denmark's, it would "cut the costs of inequality-related social problems and increase social value by £7.35 trillion" net over the next 40 years.[63]

4. Full Cost Pricing

Another effective way to reduce resource use is to reflect the full social and environmental cost of extracting raw materials, processing them into products, mitigating the impacts of product or service use, and all disposal costs in the price of any product or service. Many of these costs are not currently counted by our accounting rules, including such expenses as the health care costs of people who get sick breathing the toxic fumes of coal-fed power plants or oil refineries; the deaths of children from food contamination; the lost productivity of people with obesity and diabetes; or the estimated $40 trillion cost of dealing with the impacts of man-made climate change world-wide.

Because these costs are hard to calculate precisely, accountants and economists do not include them in a business's or government's cost of operation. They are called externalities because they are not included in a company's financial statements. As a result, these expenses are currently paid by society, not the economic activity that produced them. These external costs must be internalized, i.e., included on financial statements, so that more accurate pricing signals can produce more appropriate resource use decisions. When the full costs of economic activities are internalized, prices will increase, helping to push down consumption and the rate of economic growth.

Fiscal authorities recognized the need for such an accounting change decades ago. Our little progress in this area, however, means we are still making very inappropriate decisions on resource use and the creation of pollution. In the absence of effective progress on internalizing all costs, ecological tax reforms and/or regulations will be needed to create more appropriate pricing signals.

[63] Spratt, Stephen, Andrew Simms, Eva Neitzert, and Josh Ryan-Collins, 2010: The Great Transition, The New Economy Foundation, London, U.K., p 4.

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5. Reducing Consumption

Probably the most effective way of reducing resource use is to reduce demand for the goods and services that require those resources. In our economy 70% of GDP comes from consumer demand for goods and services, while the remaining 30% comes from the resources and services used to acquire, process, manufacture, and sell those consumer products, as well as to take care of the waste from their production and their disposal. The demand for infrastructure to support this cycle (e.g., highways, bridges, airports, communication systems, financial systems, energy systems, landfills, water processing and delivery systems, etc.) can be considered to be part of this production and consumption cycle. This ties growth in GDP and growth in consumption closely together.

The U.N.'s 2010 report on human development, called The Real Wealth of Nations: Pathways to Human Development, noted that climate changes and the globalized consumer society are becoming the biggest threats to future wealth and happiness.[64]

Reducing consumption can reduce resource use, but it also reduces economic activity. While economic activity will have to decline for the world to stay within its carrying capacity, as we have described, those declines comes with some challenges, including unemployment and declining incomes.[65] But there are solutions to these and the other problems created by declining economic activity.[66]

The challenge is that we are not acting in any significant way on implementing these solutions. Heinberg summarizes this situation with the statement "our problems are resolvable in principle," followed by the qualification, "if we are willing to change our way of life and the fundamental structures of society." He also observes that "our society as a whole is not inclined to do what is required to solve them, even if the consequences of failing to do so are utterly apocalyptic."[67] We

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[64] Klugman, Jeni, 2010: The Real Wealth of Nations: Pathways to Human Development, The United Nations Development Programme, New York, NY.

[65] For a good description of this potentially self-reinforcing destructive feedback loop that leads to declines in GDP growth rates, see Heinberg, 2011, *op. cit.,* pp 6-9.

[66] For a nice list of the many books describing these solutions, see Heinberg, 2011, op. cit., pp 259-261.

[67] Heinberg, 2011, *op. cit.,* p 261.

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should also note that these changes are not necessarily undesirable. They can improve the quality of our lives.

Why are we not acting in any significant way to solve these problems when the consequences of not acting could be horrendous, and acting now could improve the quality of our lives? What is it about the 18 major complex civilizations in the history of the world, all of which collapsed, that caused Joseph Tainter to conclude that, "people will rarely acknowledge that an accustomed way of life is unsustainable except in the face of prolonged, devastating failure?"[68]

One of the most important factors limiting change is the lure of the culture of consumerism. The majority of people in developed countries believe material goods are indicators of their success and social standing. We are told hundreds of times a day that consumption will produce satisfaction and a rewarding life. The culture of consumerism encourages unproductive status competition, and its throw-away economy stimulates unnecessary resource use. We are bombarded constantly with these consumption messages through the media, social norms, our education system, and other signals encouraging us to express ourselves and search for meaning through material consumption. Advertisers spent over $110 billion in 2010 to encourage status based consumption, and this message is central to the roughly 20,000 TV commercials our children see each year. Since most of these messages link consumption to status and a successful life, it is no wonder that our culture of consumerism is hard to change. Developing countries are not far behind us in taking up the mantra of consumerism.

Another dynamic making it tricky to evolve from the culture of consumerism is the implications for unemployment. If consumer demand represents 70% of GDP, reducing consumption will take pressure of resource use, but it will also reduce GDP, creating recessionary conditions and increasing unemployment. George W. Bush was thinking of GDP growth when he unfortunately urged Americans to "go shopping" as the best response they could make to the tragedy of 9/11.

In spite of these barriers, we can develop a better alternative than the culture of consumption. Our system of consumption is not the outgrowth of some natural law of economics. This system was created intentionally to utilize the nation's excess production capacity after World War II. Retailing analyst Victor LeBow described this post-war strategy by saying, "Our enormously productive economy demands that we make consumption our way of life, that we convert the buying and using of goods into rituals, that we seek our spiritual satisfaction, our ego satisfaction in

[68] Allen, T.F.H., *et. al., op. cit.*, p 150.

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consumption…. We need things consumed, burned up, replaced and discarded at an ever increasing rate."[69] This defines exponential growth. The Chairman of President Eisenhower's Council of Economic Advisors said, "The American economy's ultimate purpose is to produce more consumer goods."[70] This is our highest purpose as a society? What a lost opportunity to set our country and the world on a more sustainable and nurturing path.

Assuming this made sense as a strategy to transition wartime production capacity to peacetime goods and services, it should have been a short term strategy. Instead it created a structural shift in the economy, which is now inappropriate, leading to the potential self-destruction of our way of life. The fact that we intentionally created the consumer based economy after WWII suggests that we can intentionally create a different structure for our economy now that we better understand the full and destructive implications of what we created.

A growing number of people are realizing that real prosperity means more than higher incomes and higher levels of consumption. True prosperity requires that people be able to flourish physically, psychologically, and socially – in other words, be able to participate meaningfully in the life of their society.[71] There are several indications that at least some sectors of our society are on a healthier path to true prosperity. One of the largest and fastest growing market segments is called LOHAS, which refers to people who put a priority on Lifestyles of Health and Sustainability.[72] The voluntary simplicity movement provides another example.[73]

Tim Kasser, a professor of psychology, investigated the high price of materialism. He found that "people with higher intrinsic values are both happier and have higher levels of environmental responsibility than those with materialistic values."[74]

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[69] Leonard, Annie, 2009: "The Story of Stuff," http://www.storyofstuff.com/

[70] *Ibid.*

[71] Jackson, *op. cit.,* p 143. Other useful treatments of this subject can be found in Whybrow, Peter, 2005: American Mania: When More Is Not Enough; Brown, Doug, 2005: Being is Enough; Brown, Doug, 2002: Insatiable is Not Sustainable; De Graaf, John, *et. al.,* 2005: Affluenza: The All-Consuming Epidemic; and papers at the Millennium Assessment of Human Behavior web site, http://mahb.stanford.edu/.

[72] See http://www.LOHAS.com.

[73] See Elgin, Duane, 1993: Voluntary Simplicity: towards a way of life that is outwardly simple, inwardly rich, William Morrow, New York, NY.

[74] Quoted in Jackson, *op. cit.,* p 149. See also Kasser, Tim, 2003: The High Price of Materialism, The MIT Press, Cambridge, MA.; and Kasser, Tim, and Allen Kanner, (eds.), 2003: Psychology and

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Mihalyi Csikszentmihalyi supports Kasser's findings with a study that shows that people engaged in activities which are both purposeful and materially light live more satisfying lives.[75]

In spite of these many benefits, making the shift away from the culture of consumerism will require the coordinated support of the many agents currently selling the supposed benefits of consumerism (i.e., corporations, advertising agencies, governments, schools, and mass media). If we can change the social norms and individual attitudes that keep the culture of consumerism alive, we will have accomplished at least half of the problem. We also must find a way to minimize the impact of declining consumption on employment levels if we are to be successful in completing the transition to a dynamic equilibrium economy.

6. Minimizing the Impact on Unemployment

Since consumer consumption is currently the primary driver of economic growth, and economic growth is believed to be necessary for full employment, citizens appear to be locked into the resource consumption cycle to maintain their jobs. Lasting prosperity requires us to define another economic dynamic which frees people from this vicious cycle.

Increasing unemployment from slowing economic growth could be offset by a transition toward low-carbon, more labor-intensive activities and sectors, such as local and organic agriculture, for example. Reducing working time through job sharing is another way to continue to maintain productivity, while protecting people's jobs, and providing them with the better work-life balance so many desire. One survey by Paul Ray found that 68% of Americans want us to return to a simpler way of life with less emphasis on consumption and wealth.[76]

Shared work arrangements provide several important benefits. First, everyone would work fewer hours, leaving more time for such things as family, healthy recreation, personal development, and community involvement. This would help provide the greater personal well-being and satisfaction people say they want.

Consumer Culture: The Struggle for a Good Life in a Materialistic World, American Psychological Association, Washington, DC.

[75] Csikszentmihalyi, Mihalyi, 2000: "The Costs and Benefits of Consuming," *Journal of Consumer Research*, 27(2), p 262-272.

[76] Brown, Doug, 2002, *op. cit.*, pp 193-194.

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Second, if broadly applied, everyone would work fewer hours, and everyone's income would go down proportionately. Many studies document the fact that, after basic needs have been met, the greatest driver of the "need" for more income (which helps drive the "need" for consumption and economic growth) is the desire to be compensated in a way that is competitive with the pay of friends and neighbors. Thus, if most people shifted to some form of job sharing, lower income would not necessarily be linked to lower satisfaction, which could be offset by greater quality of life. The lower income levels resulting from shared work would also reduce status-based conspicuous consumption, thereby helping to reduce the use of natural resources.

Mondragón is a good example of how effective work sharing programs can be. The Mondragón Cooperative Corporation is a holding company of co-op, worker-owned businesses in the Basque region of Spain. Begun in 1956, Mondragón is now an integrated collection of 110 industrial, financial and retail co-op businesses with more than 100,000 worker-owners and total revenues of over $24 billion per year. It is the 4th largest industrial, and the 7th largest financial group in Spain.[77]

When the current recession hit Mondragón, worker-owners and managers decided that 20% of the workforce would leave their jobs for a year at 80% pay plus free training for other work if they wished. The group would be decided by lottery, and if the company was still overstaffed a year later, the first group would return to work, and a second group would take a year off. This approach not only maintained employment at Mondragón, it also allowed Mondragón employees to continue spending in their local communities, thereby keeping unemployment and its related problems low in the region.

Also, the assumption that declining economic activity leads to increasing unemployment is not necessarily true. The possibility that unemployment could go down instead of up in the transition to a dynamic equilibrium economy was demonstrated in an analysis by Peter Victor of a steady-state scenario for the Canadian economy. By managing several macro-economic variables, Victor demonstrated that GDP growth could be reduced from 1.8% per year to under 0.1% per year – essentially no-growth. In this scenario, the transition to a stable-state economy was accompanied by reductions in unemployment, poverty, and the debt to GDP ratio to at least half their previous levels, as is shown in Chart 10 below.[78] Green house gas (GHG) emissions would also be substantially reduced.

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[77] Schwartz, Judith, "In Cleveland, Worker Co-ops Look to a Spanish Model," *Time Magazine*, December 22, 2009.

[78] Jackson, *op. cit.,* pp 134-135.

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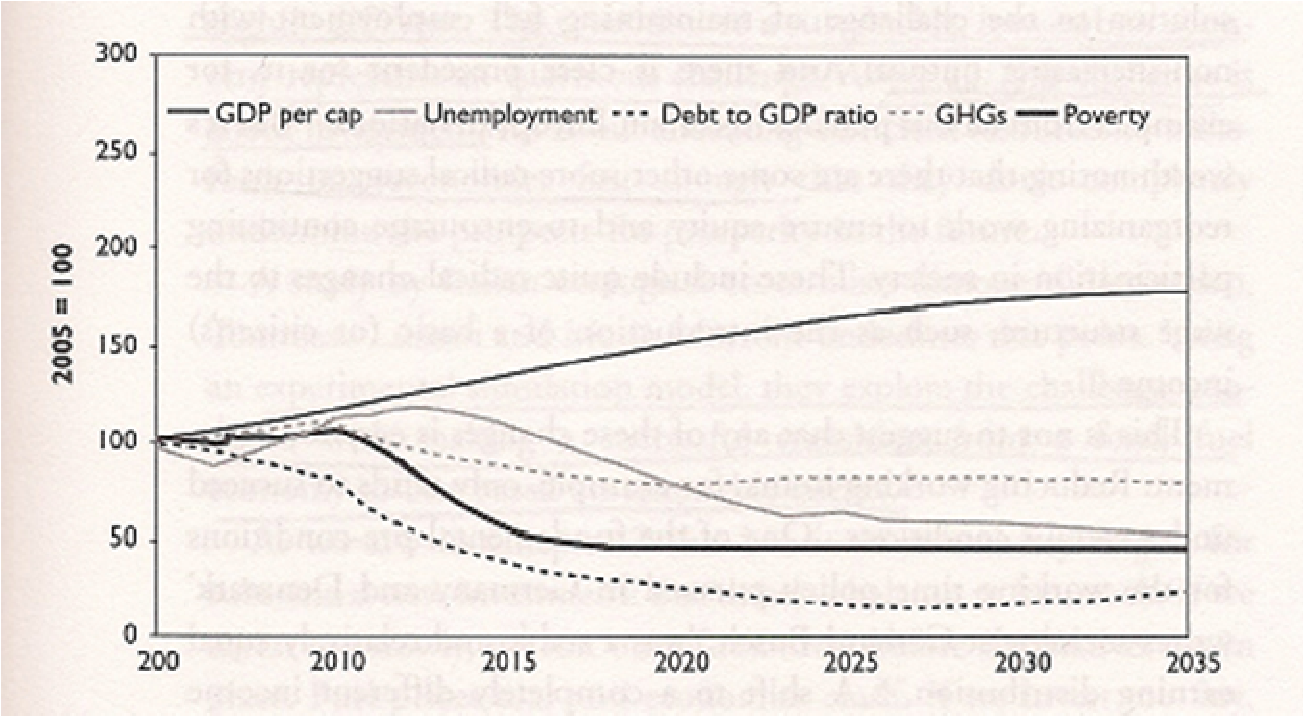
Chart 10: Model of a Low Growth Strategy for Canada



So the transition to a dynamic equilibrium economy could proceed in a way that does not necessarily create the problems of widespread unemployment.

7. Investing in Natural and Social Systems

Capital investment is a critical component of economic activity. From a sustainability perspective, one of its most important functions is to support innovations that reduce the resource requirements for a given level of economic production. Capital investments can also increase the productivity of labor. Appropriately targeted capital investments will be particularly critical to support our transition to a dynamic equilibrium economy. Priority investment areas include "resource productivity, renewable energy, clean technologies, green business, climate adaptation and ecosystem enhancement."[79]

One of the most urgent investment opportunities is in the transition to a sustainable, low-carbon energy economy. While this transition offers significant opportunities, it also requires an important macro level balancing act. According to

[79] Jackson, *op. cit.,* p 138.

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an investment simulation model of the transition to a non-fossil fuel world, "if we invest too slowly, we run out of resources before alternatives are in place. Fuel prices soar and economies crash. If we invest too fast, there's a risk of slowing down the economy to the extent that the resources required for further investment aren't available…. There is a narrow 'sustainability window' through which the economy must pass if it is to make the transition to a non-fossil world successfully…. This 'sustainability window' is widened if the balance between consumption and investment in the economy can be changed."[80] In other words, reducing consumption and increasing investments in the drivers of dynamic economic equilibrium increases our chances for a successful transition to renewable energy sources.

Traditional economics suggest that increasing capital investment stimulates economic growth. However, if such capital investments come from capital saved because of lower consumption instead of from debt, they can help reduce economic activity and resource use instead of stimulating growth.

8. Fixing Inappropriate Discounting (Valuing the Future)

Another challenge of investing in natural and social systems is that these are often long term investments, and their full value is not recognized by our accounting or economic metrics (i.e., it is discounted). One of the most important elements in realigning investment priorities is the way we value the future. Because the benefits of long term investments are discounted more heavily than are short-term investments, long term investments find it harder to compete for available capital. We need to find a way to recognize the full value of longer term ecological and social investments to reveal that they are at least comparable in value to shorter term and particularly speculative investments. To do this requires a rethinking of the concept of investment discount rates. We favor today too much over tomorrow, a problem that arises from hyperbolic discounting.

Hyperbolic discounting means valuing what happens today more than what will happen in the future in a way that increases the discount amount over time. In other words, the longer the time before receiving benefits, the higher the discount rate. Discounting is used to explain people's behavior when they do something today that puts their lives in danger in the future. Examples include a heart patient who eats fatty foods today just because they taste good even though they increase

[80] Jackson, *op. cit.,* p 137, describing simulation research by Italian ecological economists Simone d'Alessandro, Tommaso Luzzati, and Mario Morroni (see reference section for full citation on this research).

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the probability of a deadly heart attack in the future, or a commercial fisherman fishing at a pace that will destroy the fishery because he has to make the payments on his boat. Ecological investments in resource conservation and restoration with large future benefits, or investments which can't be easily valued, such as investments to reduce species loss, or the value of the last tree cut down on Easter Island, need to be computed in a way that makes them competitive with an investment in short term consumption and disposal.

This is what Paul Hawken is pointing to when he says, "We have an economy that tells us that it is cheaper to destroy earth in real time rather than renew, restore, and sustain it. You can print money to bail out a bank, but you can't print life to bail out a planet. At present we are stealing the future, selling it in the present, and calling it gross domestic product. We can just as easily have an economy that is based on healing the future instead of stealing it. We can either create assets for the future or take the assets of the future. One is called restoration and the other exploitation. And whenever we exploit the earth we exploit people and cause untold suffering. Working for the earth is not a way to get rich, it is a way to be rich."[81]

Discounting the future can be a valuable trait from an evolutionary perspective. Focusing on immediate threats, such as a hungry lion, more intensely than on possible future threats, such as running out of food next week, has greater survival value for a hunter gatherer on an African savanna. But this way of thinking also sees no problem in exponential growth which exhausts critical, non-renewable resources for the benefits of using them today. Hyperbolic discounting is a way of thinking consistent with exponential growth.

On the dynamic equilibrium side of the inflection point, however, this approach to the future is much less appropriate. We need some new thinking about how we treat the future of real resources vs. financial instruments. A different way of discounting the future may seem "illogical" simply because it is the result of a transformation. In fact, placing a greater value on the future has the highest survival value in a dynamic equilibrium economy. For example, while it makes no sense under hyperbolic discounting, people around the world have shown a willingness to allow a few to starve rather than eat the seeds necessary for planting

[81] Paul Hawken, "Commencement Address to the Class of 2009," speech at University of Portland, Portland, OR, May 3, 2009.

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crops in the coming spring so that all can survive.[82] There are a growing number of examples of the need for alternative models of "discounting" the future.[83]

9. Redesigning Taxation

Our tax code, in its current form, is ridiculous. It has grown to almost 17,000 pages of such complexity that following the advice of an advisor from the IRS is not considered an adequate defense for a mistake on your tax return. There are growing calls for simplifying our tax code. Incentives for growth and accelerated resource use are the drivers for most of this complexity. While these objectives might have been more appropriate on the exponential growth side of the inflection point, transitioning into a different economic environment requires us to redesign the tax code to be more appropriate to the dynamic equilibrium needs of the right side of that inflection point. The challenge is to make the adjustments in a way that supports Main Street businesses and local economic resilience, rather than Wall Street and the richest 1% of our citizens.

Our current tax system reflects the influence and lobbying power of Wall Street and special interests. It discourages by taxing things most people would like to have more of, such as an adequate income, and exempts from taxation things we would like less of, like income extremes, carbon emissions, excess consumption, and the unsustainable use of non-renewable resources.

Tax shifting is a well recognized strategy for rebalancing these inequities. Tax shifting adjusts taxes away from what we want more of, to what we want less of – generally in a way that is roughly revenue neutral. In Europe and the United States, polls indicate that at least 70 percent of voters support environmental tax shifting once it is explained to them. Some 2,500 economists, including nine Nobel Prize winners in economics, have endorsed the concept of tax shifts.[84]

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[82] Gintis, Herbert, 2002: "Beyond *Homo Economicus*: Evidence from Experimental Economics," *Ecological Economics*, 35 (2000), pp 311–322.

[83] For example, see Frederick, Shane, George Loewenstein, and Ted O'Donoghue, 2002: "Time Discounting and Time Preference: A Critical Review", *Journal of Economic Literature* 40 (2), pp 351–401; and Laibson, David, 1997: "Golden Eggs and Hyperbolic Discounting", *Quarterly Journal of Economics*, 112 (2), pp 443–477.

[84] Brown, Lester, 2009: Plan B 4.0: Mobilizing to Save Civilization, W. W. Norton & Co, London, UK., p 246.

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One example of appropriate tax shifting is proposed by Harvard economics professor Gregory Mankiw, who wrote: "Cutting income taxes while increasing gasoline taxes would lead to more rapid economic growth, less traffic congestion, safer roads, and reduced risk of global warming—all without jeopardizing long-term fiscal solvency."[85] Other examples include reducing taxes on income from real work, and shifting it to a tax on financial transactions. A 1% tax on financial transactions would produce around $1 Trillion per year, which could be used to reduce income taxes, or to balance the budget.[86] Other shifts could raise taxes on unhealthy food in order to subsidize healthy food, on cigarettes to pay for the full level of related health care costs, or on landfill use to encourage recycling.

Another form of tax shifting is based on who is paying the taxes. The most productive period of real growth (as opposed to bubble growth) in recent economic history was between 1950 and the late 1970s, when the nation's middle class developed as the driver of the nation's economic engine. During that time the top tax rate on individual income ranged from 70% to 90%,[87] and the top tax rate on corporate earnings hovered around 50%.[88] Those tax rates were cut starting with President Reagan in the 1980s until today the highest income tax rate for both individuals and corporations is 35%, and investment income is taxed at 15%. These tax rate changes have substantially increased economic inequity in the U.S. In 1970 the nation's top 100 CEOs earned 45 times the average worker. Because of these tax rate changes and various loopholes, by 2008 CEO earnings averaged 1,000 times the average worker, the highest differential in the world.[89]

Some of the most important consequences of these tax rate changes are 1) the development of speculative bubble-to-bust economic gyrations, which didn't happen in the 1950 to 1980 period, and 2) a dramatic increase in the income gap between our nation's richest and poorest citizens. In fact, the U.S. is one of the few

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[85] Mankiw, Gregory, "Gas Tax Now!" *Fortune Magazine*, May 24, 1999, pp 60–64.

[86] McKinnon, John, "Democrats Weigh Tax on Financial Transactions," *Wall Street Journal*, October 10, 2009.

[87] See http://www.docstoc.com/docs/23188185/Federal-Income-Tax-Brackets-and-Maximum-Tax-Rates-1950-1980.

[88] See http://www.irs.gov/pub/irs-soi/02corate.pdf.

[89] Heinberg, Richard, 2011: *op. cit.,* p 60.

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developed nations in which income inequality has increased since 1980.[90] One consequence is that income inequality in the U.S. is now comparable to Russia or Turkey. The trickle down approach to creating jobs and economic benefits clearly is not working, and the cost is substantial. As mentioned earlier, inequality is strongly correlated with health and social problems (see Chart 9), and an investment in solving inequality-related social problems in the U.K. would cut the costs of those problems and increase social value by £7.35 trillion" net over the next 40 years.[91]

10. Leveraging the Potential of the Business Community

The business community can make an important contribution to fixing our economic model. They are such an integral part of our economic life, that we are unlikely to be able to solve our challenges without their participation. In spite of the many economic, social and environmental problems caused by businesses following the current economic model, businesses must participate in helping us transition to a steady-state economy. R. Kaku, the Chairman of Cannon, said that in addition to people, "There is only one entity whose effort to create stability in the world matches its self-interest. That entity is a corporation acting globally."[92] He defined acting globally as contributing to customers, employees, and to society. Unfortunately, not enough businesses understand this alignment of public and corporate interests.

The good news is a growing number of corporations are working to be more environmentally and socially responsible.[93] A revolution is underway in today's organizations. Companies around the world are boldly leading the change from dead-end business-as-usual tactics to the transformative strategies that are essential for creating a flourishing, sustainable world. There is a long way to go, but the era of denial is ending. Today's most innovative leaders are recognizing

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[90] According to the GINI Coefficient of income inequality - see: "Income Inequality in the U.S.," http://en.wikipedia.org/wiki/Income_inequality_in_the_United_States.

[91] Spratt, *et. al*., 2010: *op. cit.,* p 4.

[92] Jaworski, Joseph, 1998: Synchronicity: The Inner Path of Leadership, Barrett-Koehler Publishers, San Francisco, CA, p 164.

[93] For a useful description of what it means to be a fully responsible business, see Carol Sanford's 2011 book The Responsible Business: Reimagining Sustainability and Success, Jossey-Bass, San Francisco, CA.

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that for the sake of our companies and our world, we must implement revolutionary – not just incremental – changes in the way we live and work.[94]

Innovative businesses are beginning to see that revolutionary changes, such as the transition to a dynamic equilibrium economy, are in their own best long-term interests. Supporting evidence includes research done in the 1980s on corporate life spans.[95] This research showed the average life of Fortune 500 companies is between 40 and 50 years, and the average life span for all companies in Japan and Europe is 12.5 years. At the same time, the research uncovered some companies with lives ranging from 100 to 700 years. One of the key differences is that the long-lived companies are "sensitive to their environment." In this research report the word "environment" is used to include the social and cultural as well as the natural systems context in which a business operates. In other words, long-lived companies understand and incorporate in their decisions the business value of investing in community sustainability, i.e., the health of the natural and social systems that support their business. As wars, depressions, technology and political changes disturbed their business environment, long-lived companies maintained their commitments to the sustainability of the communities that supported them, understanding their changing needs and adapting effectively and responsibly.

These are the businesses that understand the ultimate limits of growth, and do not discount the value of long term investments in social and environmental well-being as Wall Street, and their economic and finance professors told them they should. These companies must be our partners in the dialog to help design and implement the dynamic equilibrium economy that is our best chance creating a more desirable future. Fortunately, there are a growing number of these businesses.

While these points provide some ideas of what the "new economy" might look like, there are still many questions, many issues to be debated, and many experiments to be undertaken before we can see how to make a dynamic equilibrium economy fulfill its promise. The immediate challenge is how to manage the transition from here to there, on the ground, in the communities in which we live. This is where the questions will be answered, and where we will discover what works for our region. We must proceed, in spite of the risk we might not get it completely right

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[94] Senge, Peter, *et. al.,* 2008: The Necessary Revolution: How Individuals and Organizations Are Working Together to Create a Sustainable World, Doubleday, New York, NY.

[95] Although the report on this research has not been made public, the research and its conclusions are described extensively in Arie de Geus's 1997 book The Living Company, Harvard Business School Publications, Boston, MA*,* pp 1-9*.* This account is based on that description.

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the first time. The alternative of business-as-usual presents much greater risks, and the time for completing such a significant transition is running short.

These macro transitions provide a framework that enables change at the local level. For most of us, this is the place where we have the most leverage and the greatest chance to make real contributions to our transition to a dynamic equilibrium economy.

Local Opportunities

Many economists are already working on how a dynamic equilibrium economy might work at the local level.[96] As Gar Alperovitz notes, "Over the past few decades, a deepening sense of the profound ecological challenges facing the planet and growing despair at the inability of traditional politics to address economic failings have fueled an extraordinary amount of experimentation by activists, economists, and socially minded business leaders."[97] Some of the key elements of a "new economy", that are receiving a surprising amount of support from participants on both the left and right, are an economy that is "green and socially responsible, and one that is based on rethinking the nature of ownership and the growth paradigm that guides conventional policies."[98]

These are consistent with one of the key principles of the new economy, i.e., the importance of local self-sufficiency as a driver of community resilience, which helps protect a community from the shocks of a transition to a dynamic equilibrium economy. For example, a resilient local community will be better able to adapt effectively to reductions in the availability of cheap energy through the development and sharing of alternate, distributed, renewable energy sources. The transition required by increasing energy prices may also include significant changes in the structure of the local economy. Economies dependent on tourism, retail sales (consumption), and the import of necessary goods and services may face

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[96] While it is tempting to explore the details of how a broader range of traditional economic principles are being redefined, the most relevant focus is on what economic development means under steady-state conditions, and what are the implications for northern Arizona. For economists with an interest in the details, I recommend Tim Jackson's 2009 book Prosperity Without Growth, and Herman Daly's 1996 book Beyond Growth.

[97] Alperovitz, Gar, "As the American Capitalist Economy Craters, Promising Alternatives Emerge," *The Nation*, May 26, 2011.

[98] *Ibid.*

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harder adjustments than communities that are more self-sufficient, with strong locally-oriented economies, a service orientation, and economies based on value-added exports and e-businesses.

Transition Planning

Planning for the transition to a dynamic equilibrium economy creates a road map of the elements that contribute to a local community's resilience. Some of the more important elements of such a plan include:

1. establishing a robust local first program;
2. supporting the development of local businesses;
3. developing community and public financial institutions;
4. creating mechanisms for investing in your local community;
5. establishing a local currency;
6. facilitating alternative business ownership models such as employee ownership and co-ops; and
7. supporting the creation of local government policies and regulations that enable the transition to a dynamic equilibrium economy.

This list focuses on initiatives that can contribute to the development of a dynamic equilibrium economy. It does not attempt to be complete, however, and does not include all of the innovative experiments emerging from around the country, such as renewable energy programs, climate mitigation plans, or the many transit-oriented planning initiatives designed to reduce transportation resource use while at the same time improving our quality of life. It also does not discuss the many important initiatives whose primary objectives are to increase social engagement, participatory democracy, volunteerism opportunities, or a sense of place. A complete transition plan should integrate all of these elements of a resilient community.

A complete transition plan should also incorporate an understanding that a steady-state or dynamic equilibrium economy means there is no net growth on a national or global level. Within the economic system, however, some communities will grow quantitatively and qualitatively, while others may experience declines. Even if equity considerations lead us to policies and programs that decrease economic activity in developed countries and regions below carrying capacity in order to provide some room for economic growth in developing countries or regions, some communities, regions, and countries will still grow while others decline.

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In this context, the important value to remember from the balanced side of the inflection point is communities that collaborate with other communities on critical resource issues will be better served and more successful as a whole than ones which pursue a competitive, take-no-prisoners approach to increasingly scarce resources.[99]

If a city, county, or some regional government body is not driving the transition planning, it is usually done by community organizations separately from traditional regional plans, land use planning, and long term visioning processes. Ideally, they should all be fully integrated, even if now is not the scheduled time for a formal planning process. These are not normal times, and formal bureaucratic processes should adjust their planning schedules to the urgency and the significance of the challenges facing our communities.

Groups in communities across the country and around the world are collaborating to evolve their ideas about economic development because of the looming impacts of the trends discussed. These local initiatives seek to create greater community resilience through diversity, redundancy, self-sufficiency, social solidarity, and an aversion to excessive integration. These characteristics enhance the chances that a community will make a successful transition to the dynamic equilibrium side of the inflection point, and adapt to the significant challenges we face.

Transition Initiatives is a grassroots movement that works to support local communities in their efforts to build community resilience in response to the challenges of peak oil, climate change, and the economic crisis. Brought to the U.S. in 2008 from its origins in the U.K., the U.S. Transition Initiative supports 93 official city groups and many more unofficial ones working on transition plans for their communities. Cities like Portland OR, Oakland CA, San Francisco CA, Austin TX, Spokane WA, Lawrence KS, Cleveland OH, Chapel Hill NC, Boulder CO, and many other cities around the country have already developed official city resolutions or produced task force reports on how their communities can respond effectively to climate change, peak oil, and the economic crisis. While these plans do not normally incorporate the implications of reducing economic activity and population growth to a dynamic equilibrium with the area's carrying capacity, these issues are implicit and easy to include explicitly in the content of a transition plan.

[99] For a further discussion of the relative value of competition vs. collaboration during our transition, see the comments from Darwin on page 98 of this white paper.

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1. Establish a robust local first program

The coming decline in overall economic activity puts a premium on taking advantage of every opportunity to support locally owned businesses. One of the most successful ways of doing this is through a "local first" or "buy local" program. Local first programs take advantage of local purchasing power by directing it to locally owned businesses before going to big box stores or out-of-town chains for items that cannot be obtained locally. This strengthens a community's economic base. The specific benefits depend on local community conditions and the type of stores analyzed.

One of the key benefits of redirecting purchasing to local businesses is the retention of spending power in the local community. One example of the many analyses of these benefits comes from Western Michigan and is shown in Table 2.

Table 2: Comparison of the Local Advantage by Industry Type[100]

	Local Advantage as % of Revenue	Local Advantage per square foot
Pharmacies & Drug Stores	77%	$330
Grocery Stores	17%	$61
Full Service Restaurants	53%	$9

The local revenue advantage means that for $100 spent in a local pharmacy or drug store, 77% more stays in local circulation than for the same amount spent in an chain pharmacy or drug store based out-of-town. That translates into an average of $330 more revenue per square foot in local stores.

An economic analysis comparing local and chain bookstores in Austin, Texas found that 45¢ of every dollar spent in a locally owned bookstore circulates in the community creating more economic value, vs. only 13¢ of every dollar spent in an out-of-town based chain – more than three times the economic impact.[101]

One advantage of this strategy is that a community does not have to create new businesses or new economic activity to receive an immediate series of benefits from every new local purchase. Some of the primary benefits of local purchasing vs.

[100] Civic Economics, 2008: "Examining the Impact of Local Business on the Western Michigan Economy," http://www.civiceconomics.com/localworks/GR_Local_Works_Complete.pdf , pp 8-10.

[101] Civic Economics, 2002: "Economic Impact Analysis – A Case Study: Local Merchants vs. Chain Retailers," http://www.liveablecity.org/lcfullreport.pdf, p 4.

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buying in big box or chain stores are documented by a variety of studies and include:[102]

- Substantially greater purchasing power retained in the local community;
- Local retail jobs increase;
- Higher standards of living because local stores generally pay higher wages than chain stores, and offer better benefits;
- Because of higher wages and benefits, states report lower costs of providing healthcare (Medicaid) and other public assistance to local business employees;
- Increased local tax revenue;
- Lower poverty rates;
- Higher social capital, measured by voter turnout and the number of active community organizations;
- Lower cost of city services such as road maintenance, police and fire protection, which are often not covered by big box or chain store tax revenues;
- Local businesses donate approximately twice as much per employee to local organizations than do chain stores;
- Relocation and development subsidies as well as tax advantages given to chain stores frequently fail to produce real net economic benefits to communities; and
- Local businesses are less likely to move out of town, meaning fewer economic and employment shocks to the local community.

Some analysts claim it usually costs more to shop local because big box and national chain stores have greater scale economies which allow them to offer comparable goods at lower prices. While this may seem logical, it is often not borne out by the facts when all the costs are considered. First, scale economies are often not as great as claimed, particularly when small-scale manufacturing options are available. Also, scale advantages are also diminished when national chain stores source products in China or food in Argentina, then ship them thousands of miles to a local store. Chain stores externalize the cost of public supported transportation infrastructure, or transport related carbon emissions, offloading them onto society to pay for separately. In other words, the price tag does not

[102] See a directory of "Key Studies on Wal-Mart and Big-Box Retail," The New Rules Project, http://www.newrules.org/retail/key-studies-walmart-and-bigbox-retail; and Shuman, Michael, 2007: The Small-Mart Revolution: How Local Businesses Are Beating the Global Competition, Barrett-Kohler Publishers, San Francisco, CA, pp 46-49.

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reflect all the costs a consumer ends up paying. Local businesses usually source their products more locally, reducing transport emissions and infrastructure costs.

Second, chain stores often impose other costs on the community by paying low wages with few benefits including health care which wind up being paid in one way or another by the community through taxes. Local stores are more likely to pay a living wage with benefits. And finally, chain stores normally respond to economic changes by laying off workers or closing stores with little thought for the community. Local stores tend to retain workers longer, partly because they often outperform national chains in tough economic times.

The challenge is educating shoppers that the real cost of their national chain purchases include higher environmental costs, higher public infrastructure costs, and higher taxes to cover the social costs not paid for by those national chains. These costs are paid by consumers through their local and state taxes, which often more than offset the savings from apparently cheaper sticker prices at chain stores. Education on these issues is a primary activity of local first programs.

The result is a growing number of cities with buy local or local first programs seeking to capture these benefits. Over 130 cities or regions have buy local programs, up from 41 in 2006. Buy local campaigns that are well executed make a big difference for local businesses and their communities. A survey by the Institute for Local Self-Reliance found that for the fourth year in a row local stores in communities with buy local programs experienced markedly stronger revenue growth compared to those located in areas without such a program. This included revenue growth of 5.6% on average in 2010, compared to 2.1% for those local stores in communities without a buy local program.[103]

Farmer's markets, community supported agriculture (CSA), and even community gardens are also versions of buy local initiatives, providing fresh, healthy, and better tasting food without long, expensive and polluting transportation. Local sourcing of food also creates greater local food independence, and can help keep food processing revenue in the community. For example, a 2006 study found that the Coconino County area lost $10 million each year because the 213 ranches and farms in Coconino County had to send their food out of the county to be processed

103 Institute for Local Self-Reliance, The New Rules Project, "2011 Independent Business Survey," http://www.newrules.org/retail/news/survey-finds-buy-local-message-benefitting-independent-businesses.

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by middlemen, who then shipped it back to the county at significant markups.[104] If kept local, that food processing business could be a substantial addition to local economic activity.

In addition, local, small-scale organic agriculture dramatically reduces the resource impacts of industrial agriculture, and increases crop yields. For example, a recent UN report found that a transition to small-scale, organic agriculture could double food production within 10 years.[105] In fact, small farms are much more productive than industrial farms, and have many additional benefits. In the U.S., for example, a four-acre farm averages $1,400 net income per acre, while a 1,364 acre industrial farm nets $39 per acre.[106] In addition to greater community self-reliance, this approach can dramatically reduce soil erosion and resource use, including fertilizers, herbicides and pesticides. Many other studies support the higher productivity and many other benefits of small, local farming.[107] As a result, local first programs should include food purchases as well as other goods and services.

2. Support the Development of Local Businesses

In addition to stimulating local purchasing through local first programs, which function at the retail and the business-to-business level, communities can also support local businesses through larger scale collaborative purchasing by major community organizations. Collaborative purchasing can often represent enough volume to stimulate new business formation to meet the demand.

Cleveland's Evergreen Cooperative is a good example of the power of collaborative local purchasing by large local institutions to stimulate new business start-ups. Evergreen leverages the strength of the city's "anchor institutions" – large

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[104] Meter, Ken, "Coconino County, Arizona Local Food Economy**,"** Crossroads Resource Center, June 25, 2006.

[105] De Schutter, Olivier, 2010: "Report submitted by the Special Rapporteur on the right to food," UN Human Rights Council.

[106] Barber, Dan, "Change We Can Stomach," *New York Times*, May 11, 2008; and Rosset, Peter, 1999: The Multiple Functions and Benefits of Small Farm Agriculture, The Institute for Food and Development Policy, Oakland, CA.

[107] For example, see Halweil, Brian, 2002: Home Grown: The Case for Local Food in a Global Market, Worldwatch Institute, Washington, DC.; and Building a Community Based Sustainable Food System, University of Michigan Urban and Regional Planning, April, 2009, http://closup.umich.edu/publications/misc/Community-Based-Sustainable-Food-Systems.pdf

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institutions with long-term commitments to the city. Beginning with the Cleveland Foundation, the Ohio Employee Ownership Center at Kent State University, and ShoreBank Enterprise, the anchor tenants now include other local foundations, hospitals, nursing homes, banks, and City Hall. These "anchor tenants" together purchase billions of dollars of goods and services each year, and they have a self-interest in ensuring that their surrounding neighborhoods are safe, healthy, and vital communities.

In 2009 the group launched the Evergreen Cooperative Laundry (ECL), designed to be both profitable and environmentally responsible. Occupying a LEED silver building, ECL uses energy efficient laundry equipment and recycles its water and heat.

Evergreen also developed Ohio Cooperative Solar (OCS) which began with weatherization services and has branched out to installing solar panels on the roofs of the city's biggest nonprofit health, education, and municipal buildings. These institutions lease their roofs to OCS for solar installations, and in turn will purchase electricity from them. On completion, OCS and its worker-owners will own the assets and the income from the largest installation of solar panels in the Midwest.

Plans are also underway for Evergreen City Growers, a year-round hydroponic greenhouse in the heart of Cleveland that will produce 3 million heads of fresh lettuce, and nearly 1 million pounds of basil per year. The company will employ about 50 local, low-income residents.

The Evergreen co-ops are structured to serve the anchor tenants' ongoing needs for laundry services, energy, and food, with possible future opportunities for janitorial services, records retention, etc. Instead of buying these services from out-of-town vendors, buying from an Evergreen co-op creates more and better local jobs and local wealth, multiplies the impact of local dollars by keeping them in the community, and regenerates the local economy, particularly in the city's most distressed neighborhoods.[108]

Cleveland is an unlikely site for such entrepreneurial growth because it has shrunk from the 5th largest city in the country 60 years ago to one of the 5 poorest cities in

[108] For more information on Cleveland's Evergreen initiative see, Breckenridge, Tom, "Evergreen Cooperative Laundry aims to help struggling neighborhoods around Cleveland's University Circle," *The Plain Dealer*, October 20, 2009; "The Evergreen Co-op Model: Economic Development with a Plan to Stabilize a Community," Grassroots Economic Organizing, http://www.geo.coop/node/515; and a video at http://blip.tv/episode/2769043.

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America today. This economic innovation is even more remarkable in the midst of a severe recession. The critical difference is collaborative purchasing by major community institutions, which are using this opportunity to make a substantial contribution to local economic resilience.

Creating local demand for local businesses is critically important, but it is often not enough for new business start-ups or existing business expansions to be successful. Communities have learned that these entrepreneurs also need a wide range of support in supplying the services demanded by the local market.

Communities can strengthen their local business environment by providing a wide range of support services to local entrepreneurs, both start-ups and existing businesses. In cities such as Fairfield, Iowa, the whole community participates in creating a culture of entrepreneurship which attracts new business formation, celebrates success, regards failure as a valuable learning experience, and results in a natural evolution from entrepreneurial success to local philanthropy. City leadership includes purchasing preferences, favorable regulations, and attractively priced financing.

While well over 50% of new business ventures fail in their first three years, Fairfield has created 4,000 new jobs in a town of less than 9,000 people by creating an environment in which entrepreneurs have a better chance of succeeding. Fairfield's complete ecosystem of support provides start-ups and existing entrepreneurs with access to capital, education on key business skills, mentoring by successful local entrepreneurs, access to national experts and entrepreneurial associations, recognition for success, and encouragement to start over when an entrepreneur does not succeed the first time.[109]

This "grow from within" strategy for developing economic resilience in a community is usually more successful than traditional approaches to economic development. Many communities are recognizing the limits of the traditional "attract and retain" business model of economic development. Such programs generally require significant investments of public capital and often do not produce positive returns on those investments.[110] Creating local jobs through new business start-ups or expansions is easier than bribing existing companies to come to town, and is more

[109] For more information on Fairfield and other entrepreneurial initiatives, see: Isenberg, Daniel, "The Big Idea: How to Start and Entrepreneurial Revolution, *Harvard Business Review*, June, 2010; and Pages, Erik, 2003: Grassroots Rural Entrepreneurship: Best Practices for Small Communities, National Center for Small Communities, Washington, DC.

[110] Kinsley, Michael, and Hunter Lovins, 1996: Paying for Growth, Prospering from Development, Rocky Mountain Institute, Snowmass, CO.

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likely to result in permanent jobs that don't move when an owner gets a more attractive bribe from another city.

3. Publicly Owned and Community Banks

Local financing is a critical tool in building a community's capacity to deal with the transition to a dynamic equilibrium economy, including dealing with the near term financial challenges of increasing energy costs and the impacts of climate change. There is significant evidence that local financing can be very effective in developing local businesses, keeping financing costs down, and providing innovative financing vehicles that would otherwise not be available. In our current recession, many businesses report they are unable to obtain financing for expansion, or even the working capital needed to keep their current work force employed, even though national banking chains are sitting on record amounts of cash.

When local businesses across the country are starving for financing, this limits their ability to contribute to local economic resilience and economic recovery. When North Dakota farmers faced a similar situation in the credit crisis of 1919, the state responded by establishing the publically owned Bank of North Dakota (BND). The state deposited all its tax receipts and other capital into BND and was able to provide the credit its farmers and businesses needed. Ninety years later, BND continues to operate profitably, cooperating on local business and farm loans with community banks, credit unions and independent banks; underwriting municipal bonds; becoming one of the leading student loan banks in the nation; and serving as the state's Mini-Fed. Partly as a consequence of this tradition of keeping state money active in the state, North Dakota is one of only two states that met its 2010 budget, they have the lowest unemployment rate in the country, the largest budget surplus in state history, and one of the lowest mortgage default rates in the nation. Community banks and credit unions also have a much better track record at investing in local businesses and stimulating local economic activity than regional or national banking organizations.

BND's ability to use state funds to profitably make credit available to local business and citizens, thereby stimulating local economic activity, has attracted the attention of several other states. Florida, Oregon, Idaho, California, Virginia, and Vermont all have politicians promoting public banks, or feasibility studies underway. The states of Michigan, Washington, Massachusetts, and Illinois already have legislation pending to establish their own state banks.[111] According to an analysis by Dr. Farid

[111] Brown, Ellen, "The Growing Movement for Publically Owned Banks," *Yes Magazine*, March 12, 2010; and Brown, Ellen, "More States May Create Public Banks," *Yes Magazine*, May 13, 2010.

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Khavari,[112] even with more conservative leveraging of deposits than in many banks, Florida estimates it could earn billions offering interest rates of 6% on CDs, 2% on mortgages, and 6% on credit cards through the proposed Bank of the State of Florida.

In 2009, Nobel Prize winning economist Joseph Stiglitz said the federal government would have been better off funding a federally-owned bank than doling out trillions of dollars to the private investment banks and CEOs who had already speculated their way into bankruptcy.

Community banks, local credit unions, and state banks usually function effectively even when national and international financial institutions stop lending because of liquidity problems or a financial melt-down such as most of the world experienced in 2008-2009. The point made earlier bears repeating. Over two years into the recession, many banks are still not lending because of stringent loan qualification requirements, and because they can make better interest rate spreads speculating in currency and commodity markets. These funds are also being used to buy back stock and pay record bonuses to their management teams. During this time the Bank of North Dakota made loans to keep local businesses operating, resulting in national lows in unemployment, bankruptcies, and mortgage foreclosures.

4. Investing in Your Local Community

Local financing is another important source of the investment capital necessary to develop alternative "least cost" energy sources, to transition old businesses to the new economy, and also to finance necessary adaptations to changing climate conditions. The challenge for Evergreen, and other worker-owned groups such as Mondragón, is raising the capital to respond to new business opportunities. Evergreen is generating its own capital to move to scale and create more employment by starting the Evergreen Cooperative Development Fund (ECDF). Modeled after Mondragón's *Caja Laboral* bank, ECDF will receive investments of 10% of pre-tax profits from Evergreen co-ops once cash flow permits. Thus, each of the co-ops will become investor-owners of the new businesses created by the Development Fund.

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[112] Brown, Ellen, "Cutting Wall Street Out: Let States Finance Their Own Recovery," *Counterpunch*, November 2, 2009.

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Unfortunately, a maze of regulations and licensing make it very difficult for independent local businesses to accept investments from local citizens. Fortunately, there are a growing number of alternatives for citizens who would rather make socially responsible, sustainable investments in their local community than see their savings vaporize in stock market fluctuations and Wall Street speculations, or be invested in mutual funds that include businesses that trash the environment and local communities in the interest of greater profits.

Investing in micro-lending pools active in your community is one option. Another is simply making deposits in a community bank or credit union, which then uses those funds to make loans to support the local economy. While the returns on deposits might not be as high as investing in a micro-lending pool, the safety of federal deposit insurance, or the National Credit Union Share Insurance Fund, makes community bank or credit union deposits a lower risk component of any local investment strategy.

Fortunately, there are additional alternative models. For example, RSF Social Financing is an investment fund that has made sustainable and locally oriented investments for 72 years. Community loan funds, such as the Vermont Community Loan Fund (VCLF) and The Redevelopment Fund (TRF) in Philadelphia, offer another model. While not FDIC insured, these funds usually implement investment safeguard that have generally performed well. VCLF, for example, has operated for over 22 years without the loss of a single dollar.[113] Worker-owned business investment funds such as the Evergreen Cooperative Development Fund provide another option for investment in local businesses. The Community Investing Center provides background information and access to community loan funds and community loan pooled funds in local communities around the country.

Community Supported Agriculture (CSA) involves investing in a share of a local farm's harvest, and is another way to invest in your local economy. It provides a source of working capital financing for farmers and ranchers. Community Supported Businesses (CSB) applies the same format to pre-paid funding for business expansion or equipment purchases. Supporters pre-pay for future delivery of products or services from that local business. This provides a local business with access to capital for growth.

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[113] Carroll, Joyce, "Nonprofit Lender Has Social Conscience," February, 2011; http://www.investinvermont.org/news/83-nonprofit-lender-has-social-conscience

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A community micro-financing pool can make start-up capital available to hard-to-finance local entrepreneurs, and crowd funding programs, such as Solar Mosaic in Flagstaff, provide another way in which local capital can be aggregated for community projects. Industrial Development Authorities (IDA), and Community Development Financial Institutions (CDFI) provide additional ways local capital can be applied to fund local economic development projects.

In summary, community investing is not as easy as calling your broker and placing an order for a listed security. Instead, the benefits are measured in both financial returns and in the wide range of benefits of living in a community with a stronger economic base where you can also have the satisfaction of shopping in support of your investments. Such investments also enable your local economy to more effectively manage the transition to a dynamic equilibrium state.

5. Create a Local Currency

A local currency also creates greater community resilience and facilitates the transition to a dynamic equilibrium economy. A local currency is printed locally and is not backed by a national government. It is intended to trade only in a small area, among subscribing participants, and amounts to a formalized barter system. Over 2,500 communities worldwide currently offer some version of a local currency, with more than 100 of these programs in U.S. communities.[114]

The reason for their growing popularity is that local currencies provide several benefits, which include:

- Money stays in the community and reinforces buy local initiatives,
- Local currencies circulate more rapidly than national currencies, resulting in greater overall economic activity,
- The community can more fully utilize its existing productive resources, especially unemployed labor, which has a catalytic effect on the rest of the local economy,
- Local currencies avoid the debt load created by the fractional reserve banking system, and

- The system allows the barter of services for many social transactions that are not a formal part of the economy (eg, child care, elder care, trading chores or

[114] See: http://en.wikipedia.org/wiki/Local_currency.

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special craft skills, and tutoring). As such, a local currency also enhances the ability of a community to build social capital.

Most local currencies take one of two forms: those with a dollar value such as Berkshares in Massachusetts (which are taxable income where they are spent),[115] and those with a time value such as Ithaca Hours in New York (which are not taxable since the IRS does not value social capital transactions). A few, such as Flagstaff Neighborly Notes, have tried to combine the two measures of value.

Edgar Cahn, the founder of Time Dollars in Chicago described his motivation as going way beyond the many economic development benefits of a local currency. In his words, "People are assets; they are our real wealth. We have to redefine those activities we honor as work to include the tasks essential to our species, like rearing children, building community, and caring for elders…. No more throw away people. It is time we declare that we will not demand subordination, peonage, or passivity as the price for providing help (through government agencies) to a human being in need."[116]

TimeBanks USA offers a start-up kit that includes instructions and software for starting a time based currency.[117] There are also dozens of books and hundreds of articles available on this subject for those interested in starting either form of local currency.[118]

6. Enable alternative business ownership models

One of the increasingly popular organizational structures chosen by entrepreneurial companies is a worker-owned or co-op business. In a worker-owned business the majority of its workforce own shares, and the majority of shares are owned by the

[115] These computer-tallied transactions are sometimes called a Local Exchange Trading System (LETS).

[116] Cahn, Edgar, "Unleashing Our Hidden Wealth," *Yes Magazine*, September 30, 2002.

[117] See http://www.timebanks.org/startup-package.htm.

[118] For example, see: Hallsmith, Gwendolyn, and Bernard Leitaer, 2010: Creating Wealth: Growing Local Economies with Local Currencies, New Society Publishers, Gabriola Island, Canada; Solomon Lewis, 1996: Rethinking Our Centralized Monetary System: The Case for a System of Local Currencies, Praeger Publishers, Westport, CT.; North, Peter, 2010: Local Money: How to Make It Happen In Your Community, Green Books, Totnes, UK.; and Schwartz, Judith, "Alternative Currencies Grow in Popularity," *Time Magazine*, December 14, 2008.

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workforce. The more a workforce has a stake in the success of their company, the more they operate as entrepreneurs, and the more flexible the company can be in response to economic changes. While most worker-owned ventures are small businesses focused locally, some have grown to national scale. Co-op businesses provide similar benefits, but are owned by their customers, such as a local retail or hardware store, or their suppliers, such as a farming co-op for milk or organic beef. Some analysts categorize worker-owned businesses as a worker-owned co-op.[119]

Worker-owned businesses are not new, but are growing in popularity because of their successes. Today worker-owned firms have more worker-owners than there are union employees in other firms.[120] Some of the benefits are increased productivity that comes from the commitment of owners to the business' success; greater innovation from collaborative problem solving; and greater flexibility in dealing with economic cycles, such as Mondragón's furlough strategy for dealing with the recession mentioned earlier as an option for dealing with unemployment.

As discussed earlier, Cleveland's Evergreen Cooperative is organized as a group of worker-owned businesses. In the Evergreen Laundry, eight initial employees are expected to grow to 50. Each will earn a living wage plus health benefits, and estimates are they will build an ownership stake of as much as $65,000 after 7 years of employment. Cleveland's mayor Frank Jackson was so impressed by Evergreen's creation of meaningful, good paying jobs in a disadvantaged part of town that his Department of Economic Development recently made a low interest loan of $1.5 million to the Evergreen Cooperative Laundry.

7. Establish supportive local government policies

Worker-owned businesses and many of the other initiatives described above require various legal enabling structures. Local governments can play an important role in developing the regulations and legislation needed to support the success of these local initiatives. City and county government bodies need to contribute their expertise to the development of each of these elements of a complete transition plan.

[119] An Employee Stock Ownership Plan (ESOP) is a format for a particular type of worker-owned business, designed to apply to larger businesses with many worker-owners whose interests are represented by a trustee.

[120] Alperovitz, Gar, 2005: America Beyond Capitalism: Reclaiming Our Wealth, Our Liberty, and our Democracy, John Wiley & Sons, Hoboken, NJ, p 81.

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Local government leadership includes coordinating a transition plan with community visioning processes, regional development plans, revisions to land use and zoning plans, and an examination of the structural characteristics of the local economy. These coordinated plans should include strategies for dealing with structural weaknesses in a local economy such as a strong dependence on imports, single-source supply chains, private transportation, industrial agriculture, retail sales, or tourism, each of which could be profoundly impacted by the end of cheap energy, the impacts of climate change, and the transition to a dynamic equilibrium economy.

Local governments also need to develop the policies and regulations necessary to enable these initiatives, or advocate for the appropriate state legislation when necessary. For example, state legislation would be necessary to support the development of a state-owned bank, and to enable worker-owned businesses. Fortunately, 12 other states are working on enabling legislation for state-owned banks, and many other states have established worker-owned business legislation. Ohio, for example, supports the Ohio Employee Ownership Center (OEOC), based at Kent State University. OEOC has supported nearly 100 Ohio companies, including the Evergreen Cooperative, to start or transition to an employee-owned business structure.

Another critical issue for community leaders is how these transition plans get developed. Having well-thought out content is only the first step. These plans will be of little value if they are not fully embraced by the community and implemented effectively.

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The Power of Positive Deviance

For transition plans to be effective, the people implementing these plans as well as the people affected by them should have ways to participate in the planning process. Community planners are familiar with many tools for facilitating participation in the planning process. To be effective, however, these processes need to go much further than a traditional "buy-in" meeting or two that presents what has already been designed by a group of "experts" or an outside consultant.

We are all familiar with change efforts in which an expert from outside or inside the community surveys what is being done, then presents his or her recommendations for what we should be doing in a report and a presentation, backed up by best practices from other communities, and accompanied by a top-down implementation plan. Local government departments also usually follow this approach. Most of these efforts never result in any meaningful change. Business organizational change and efficiency improvement efforts based on this "expert consultant" model fail to meet some or all of their goals from 70% to 90% of the time. In the consulting business, these reports are called "credenza ware" because they just sit on a manager's credenza looking good.

A process that is less well known, but in many cases much more effective, is the Positive Deviance approach. This process has solved some of the most complex and difficult civic and behavioral problems by turning traditional expert-driven approaches upside down.[121]

Positive deviance is based on the discovery that the expertise to solve many community problems often rests in someone or group within the community that has already solved the problem. For problems ranging from increasing childhood malnutrition, or high school drop-out rates, to AIDS proliferation, increases in vaccine resistant infections, growing prison recidivism, falling pharmaceutical sales, R&D lab inefficiencies, and many other problems, the community involved often knows of some community members who consistently out-perform everyone else. When studied, these positive deviants (PDs) can reveal solutions that work in that community, under the same constraints everyone else experiences, against all the odds. Often the PDs themselves don't know what there are doing that is different, or why what they are doing works better. When a community team identifies these PDs, studies them, and understands how they are succeeding, it is the team's discovery. They now own the solution. They do not need to be motivated to

[121] Pascal, Richard, Jerry Sternin, and Monique Sternin, 2010: The Power of Positive Deviance: How Unlikely Innovators Solve the World's Toughest Problems, Harvard Business Press, Boston, MA.

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implement it, and no one knows how to implement it better than they do. All the outside "experts" had best get out of their way.[122]

This approach is consistent with the values of local self-reliance, collaboration, and community involvement that are critical to the transition to a dynamic equilibrium economy – on the right side of the inflection point. The challenges of transitioning our attitudes, values, beliefs, and ways of thinking about economic growth, climate change, the end of cheap energy, and recovering from the financial melt-down are just as complex and potentially intractable as many of the challenges that have already been solved by the PD approach. In each case, challenges were more successfully resolved by trusting the community to discover the PDs, determine why they are succeeding, and share their findings and their motivation for change with the rest of the community. The positive deviance approach does not work in all cases, but it is an important tool that may prove very useful in dealing with many of the transition challenges we face

In summary, however we approach implementation, a simple description of what we must do as a community is to move the trajectory of exponential growth into balance with our carrying capacity. We could also describe this challenge as making the transition across the inflection point between different attitudes, values, beliefs, and world views. A change in these attitudes and beliefs is essential if we are to evolve into a sustainable balance with the world in which we live.

This challenge is expressed graphically in Diagram 5 below. The thin blue line represents the unsustainability of exponential economic growth. The dotted lines highlight our roles. The vertical dotted lines pointing upward represent the contributions that technical innovations and operating efficiencies can make toward increasing our community's and the world's carrying capacity. This carrying capacity increase seeks to counter the downward pull on our carrying capacity from resource reduction, accelerating species losses, climate changes and population growth. In the context of these opposing forces, we must reduce our economic activities to a dynamic balance that remains within our carrying capacity.

[122] Pascale, Richard, and Jerry Sternin, "Your Company's Secret Change Agents." *Harvard Business Review*, May 2005.

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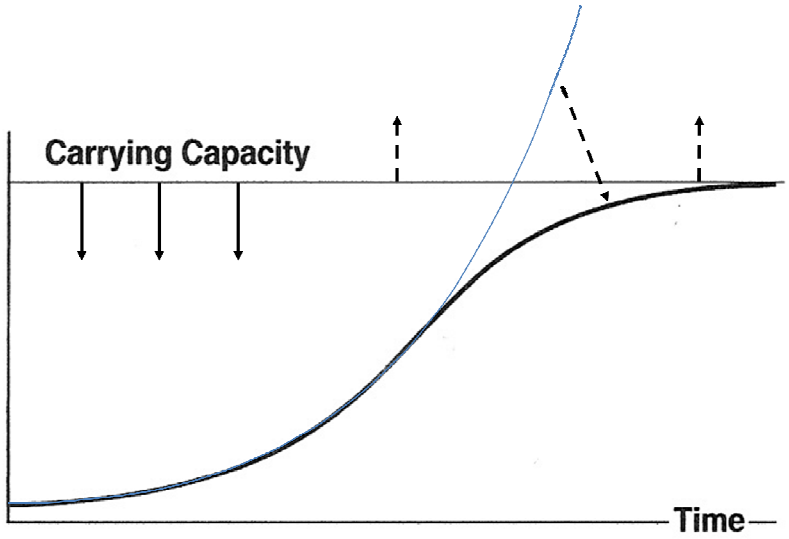
Diagram 5: Our Role in the Transition



The many local initiatives already described represent several places where we can create movement along the dotted arrows. Each initiative will make an important contribution, and we can start wherever we feel called. The macro level changes identified remind us of some of the national and global initiatives we can support. The local level changes suggest leverage points around which we can organize local action teams and change agents.

David Korten provides a unique summary of what we can do at both the macro and local levels in the form of a proposed speech by President Obama, which can be found in Appendix A of this paper. This summary covers some of the key elements of both the macro policies and the local programs that will help us make important progress on our great transition to a dynamic equilibrium economy.

This work will not be easy, but it is critically important. While we may not be in formal leadership positions, the opportunity is for each of us to lead by example. This is the type of leadership required by the great transition we face.

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The Call for Generative Leadership

The call for leadership in this situation is for a type of leader different than what is generally thought of when people talk about leadership. For the most part, leadership is associated with the authority that comes from a hierarchical role, such as a Mayor, CEO or Bishop. The expectation is that the leader sees the big picture, will act in our best interest, and will tell us what we should do. This picture is of a form of leadership that is of limited effectiveness, and is not appropriate for life on the dynamic equilibrium side of the inflection point.

One of the most fundamental characteristics of the challenge of exponential economic growth is that this is a community concern, and the transition to a dynamic equilibrium economy will require collaborative, coordinated, community-wide responses. This is because the scale and complexity of the challenge calls for contributions from the best minds across a wide range of disciplines, and because the most important response is a change of the ways we think about our consumption patterns, what is really important in our lives, and how we can have more by buying less. We all will have to understand that the transition to a steady-state economy is about getting more of the things we really need, rather than it is about giving up things we've been told we should want.

SEDI is an example of the many organizations which can play an important role in helping to develop and implement these collaborative, coordinated responses. One role is to call attention to the challenge, as SEDI has always done around sustainability issues. Another role is to facilitate discussions about the community's options, and marshal others to participate in developing and implementing plans for the path to community resilience.

These roles are examples of what is meant by generative leadership. Peter Senge described this approach to leadership with the words, "Leadership, in its essence, is about learning how to shape the future. Leadership exists when people are no longer victims of circumstances but participate in creating new circumstances. When people operate in this domain of generative leadership, day by day, they come to a deepening understanding of … how the universe actually works. That is the real gift of leadership. It's not about positional power; it's not about accomplishments; it's ultimately not even about what we do. Leadership is about creating a domain in which human beings continually deepen their understanding of

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reality and become more capable of participating in the unfolding of the world. Ultimately, leadership is about creating new realities."[123]

If leadership is about creating new realities, then leadership is a call to service. The concept of servant leadership was first formulated by Robert Greenleaf. As he described it, "The essence of leadership is the desire to serve one another and to serve something beyond ourselves, a higher purpose. In our traditional way of thinking, 'servant leadership' sounds like an oxymoron. But in a world of relationships, where relatedness is the organizing principle of the universe, it makes perfect sense."[124] Relatedness is not only the organizing principle of the universe,[125] it is also a core value on the balanced side of the inflection point.

Generative leadership requires a keen observation of the new realities trying to emerge in the world, and a commitment to serve their emergence. This keen observation includes understanding the growing complexity of a situation, and its building to a tipping point which will trigger structural changes. This is the situation that is developing around the need to transition to a dynamic equilibrium economy. When these conditions develop, small contributions can trigger major shifts in the behavior of a system, such as our current economic system. The branch of mathematics known as chaos theory calls a small change which triggers major system shifts "sensitive dependence on initial conditions," or "the Butterfly Effect." This name comes from chaos theory's model in which, under the right conditions, the beating of a butterfly's wing in Mexico can disturb the air just enough for the downstream effects to cause a tornado in the Midwest.[126]

Science's recognition of this state of sensitive dependence on initial conditions is a validation of what mystics have been saying for centuries. One person has often been at the pivot point of world changes. Mystic traditions teach that the greatest tool for good, the most powerful way to change the world, is to secretly commit

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[123] Jaworski, *op. cit.,* pp 3 & 182.

[124] *Ibid.,* p 59.

[125] The importance of relatedness is also a core observation of quantum mechanics, and of the science of how ecosystems function. As a generation we are struggling to move beyond the simplistic notions of Newtonian mechanics that we learned in school. Newtonian mechanics describes the universe as operating like a machine, in which the whole equals the sum of its parts. In quantum mechanics and ecological science, understanding how things work requires a primary focus on the relationships among things rather than just on the things themselves.

[126] Gleick, James, 1987: Chaos: Making a New Science, Viking Press, New York, NY, pp 11-31.

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little acts of compassion. They say it changes you, and changing you changes the world.[127]

Scientific validation of this experience comes from the hundredth monkey phenomenon, supported by a wide variety of experiments. This phenomenon gets its name from research on the Japanese island of Koshima. A band of monkeys on the island were fed by dropping sweet potatoes on the beach. Soon one of the monkeys learned to wash the sand off in the ocean before eating the potatoes, and the practice soon spread to all the other monkeys on the island. Soon after, the monkeys began washing all their food in the ocean before eating it. What was really remarkable, however, is that at the same time another group of researchers on the distant mainland at Takasakiyama noticed another group of monkeys also suddenly began washing all their food in the ocean.[128] Biologist Rupert Sheldrake's research suggests that this phenomenon is enabled by the resonance of a morphic field which facilitates social learning across space and time.[129]

I believe the compounding of problems created by our traditional exponential economics is building sufficient tension for change that the system is primed for butterfly effects. Small actions taken in various places will complement many grass root initiatives to redefine the purpose of our economy, to change the measurement of economic activity so it better reflects what we really value, and to place social and environmental values above profits. The cumulative effect will trigger a tipping point in the way we think about, participate in, measure, and regulate our economy.

There are many examples of how relatively small actions can precipitate major changes in large and complex cultural, political and economic systems.[130] Some examples include:

- Tunisia, 2011: A 26 year old vegetable seller's self-immolation sparked the Arab spring

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[127] Hartmann, Thom, 2004: The Prophet's Way, Park Street Press, Rochester, VT.

[128] Ibid, pp 103-107.

[129] See Sheldrake, Rupert, 1981: A New Science of Life: The Hypothesis of Formative Causation, J. P. Tarcher Inc. Los Angeles, CA.; and Sheldrake, Rupert, 2009: Morphic Resonance: The Nature of Formative Causation, Park Street Press, Rochester, VT.

[130] More detailed stories behind each of these examples can be found in Steve Crawshaw and John Jackson's article "Ten Everyday Acts of Resistance That Changed the World," *Yes! Magazine*, April 2011.

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- Poland, 1982: Solidarity strikers supported by Swidnikians' public refusal to watch government news propaganda, triggered a government acceptance of the striker's demands

- Uruguay, 1973-1985: Public refusal by a group of mothers to sing the national anthem at public events ultimately toppled a military dictatorship

- Ireland, 1880: A boycott of English goods began the Irish resistance of English dominance which eventually led to Irish independence

- Britain, 1984: Painting "white" and "black" above Barclays Bank's ATM machines triggered an end to Barclay investments in apartheid South Africa

- Liberia, 2003: A group of women dressed in white, standing by the road in protest, ended a civil war

- United States, 1993: A twenty-something law student established the principle of corporate responsibility for human rights abuses on projects in foreign countries (Unocal in Burma)

- Kenya, 2009: Women refused sex after a contested election until post-election violence stopped

- Denmark, 1943: A German diplomat with a conscience conspired to save 7,000 Jews in Denmark

- Israel, 2002: A tank gunner refused to fire on civilians in occupied Palestine sparking a rebellion among Israeli troops

- United States, 2011: Wisconsin unions triggered a national revolt of the middle class against excessive government budget-related initiatives

These examples illustrate the fact that "judgments that serious change cannot take place often miss the quiet buildup of potentially explosive underlying forces of change."[131] We should not be overwhelmed by the size of the challenges we face, for "fundamental change, radical systemic change, is as common as grass in world history."[132]

[131] Alperovitz, 2011, *op. cit.*

[132] Alperovitz, 2005, *op. cit.*, p *ix*.

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In Paul Hawken's words, "Healing the wounds of the earth and its people does not require saintliness or a political party, only gumption and persistence. It is not a liberal or conservative activity; it is a sacred act. It is a massive enterprise undertaken by ordinary citizens everywhere, not by self-appointed governments or oligarchies."[133]

The call to generative leadership may require some of us to expand our commitments and evolve our thinking, and that can be uncomfortable. Participating in the transition to a "new economy" will likely be challenging to say the least. It requires nothing less than becoming "disenthralled" in Lincoln's words. This call, and the challenge it brings to each of us, is a fundamental human experience, described in stories from around the world. Carl Jung called these stories a human archetype. Joseph Campbell named this archetype The Hero's Journey.

[133] Hawken, Paul, 2007: Blessed Unrest: How the Largest Movement in the World Came into Being and Why No One Saw It Coming, Penguin Books, New York, NY, p 5.

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The Hero's Journey

Many generations face defining challenges. Tom Brokow's "greatest generation" fought the threat of Nazism and Fascism, defeating these challenges to democracy and individual freedoms. Previous generations have been defined by triumphing over the challenges of slavery, colonialism, feudalism, and many others.

It seems the complexity and the stakes of these challenges increase with each stage of our social evolution. The defining challenge of our time is managing the transition across the inflection point – saving humankind from the natural consequences of thinking the earth is a resource pool to be consumed through our economy, which claims the right to destroy natural, social, and democratic systems in the single-minded pursuit of profits. If we fail to make the transition to a "new economy", and deal with the many results of exponential population growth, James Lovelock predicts the consequences could be the elimination of 6 out of every 7 human beings alive today, along with 30 to 50% of all remaining species of plants, animals, and other life forms.[134]

This challenge is an example of the "call to adventure" that comes to each of us on our personal journey through life. Joseph Campbell used his research, and the previous work of Carl Jung, to describe an archetypal story which is characteristic of the lives of people around the world and across the ages. He called this archetypal story the Hero's Journey.[135]

The hero's journey has four stages. The first stage is the "call to adventure". The situation for the hero is described as a wasteland – a condition in which his traditional concepts, goals, beliefs, and emotional patterns no longer seem appropriate. Sometimes this feeling is expressed in the phrase "there must be more to life than this." Life feels inauthentic. The hero is feeling the cognitive dissonance of living on the accelerating growth side of the inflection point.

The call to adventure can come in many ways, from subtle to overpowering. Jaworski describes this call as a "call to service, giving our life over to something larger than ourselves, a call to become what we were meant to become, a call to

[134] Orr, 2009, *op. cit.*

[135] Campbell, Joseph, 1973: The Hero with a Thousand Faces, Princeton University Press, Princeton, NJ.

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fulfill our destiny."[136] Martin Buber captures the profound nature of the commitment required when he notes that at this point a person "must sacrifice his puny, unfree will that is controlled by things and instincts, to his grand will, which quits defined for destined being."[137] In our world, this is the call to cross the inflection point and create more healthy and resilient communities.

Some people respond promptly to this call to adventure. Others postpone a commitment for years, denying the call itself from fear of a loss of security, friends, their comfortable life, or family disruption. Most politicians today are denying the call to do something about climate change, and most business people fear that making commitments to environmental safety and responsibility will cost them money if not their jobs. If the response is postponed, the resulting restlessness continues until the growing discomfort motivates one to finally make a commitment. Sometimes a Guide appears – someone or something that facilitates a decision. When the hero makes a commitment in response to the call, he crosses a threshold. Martin Buber describes the feeling of urgency crossing this threshold as "not what we 'ought to' do; rather we cannot do otherwise."[138]

The second stage of the hero's journey begins when he moves beyond the threshold of commitment into unfamiliar territory. The hero has few guidelines or maps, and must rethink many basic assumptions to deal with the tests, trials, and ordeals that he will encounter. These trials force a reexamination of traditional paradigms. They also provide an opportunity to learn from the inevitable failures experienced as the hero struggles to adapt to new territory without a map.

At the same time, the power of the hero's commitment unleashes powerful forces of support. W. H. Murray, a leader of the 1951 Scottish Himalayan Expedition, described the power of this commitment and the powerful forces it marshals in the following way: "The moment one definitely commits oneself, then Providence moves too. All sorts of things occur to help one that would never otherwise have occurred. A whole stream of events issues from the decision, raising in one's favor all manner of unforeseen incidents and meetings and material assistance, which no

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[136] Much of this description of the Hero's Journey is based on Jaworski's experience of his own journey, and his analysis of Campbell's work. Jaworski, *op. cit.,* pp 119-121.

[137] Buber, Martin, 1958: I and Thou, Ronald Smith (translator), Charles Scribner's Sons, New York, NY, p 59.

[138] Buber, Martin, 1970: I and Thou, Walter Kaufmann (translator), Simon & Schuster, New York, NY, p 160.

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one could have dreamed would have come their way."[139] Murray ends by quoting a Goethe couplet "Whatever you can do or dream you can, begin it. Boldness has genius, power and magic in it!" These powerful forces provide an antidote to the trials and failures of this stage of the journey.

The third stage of the hero's journey involves one or more supreme ordeals – tests of what the hero has learned and of his continued commitment to the journey. To succeed, the hero must break through personal limitations, overcome the disorientation of giving up his traditional views of the world, and forge a new operating paradigm that allows him to be more effective. In the context of sustainability, this might mean learning to collaborate with organizations that are destroying the environment to help them develop a better way of operating, or developing the ability to understand the systems effects of a decision even though it requires abandoning cherished positions. The hero emerges from this ordeal no longer the same person.

In the fourth stage of the journey, the hero returns home with an "elixir" for the restoration of his community. It can be a difficult return. Because of the hero's changes, his friends may hardly know him, and good people may be at a loss to comprehend his message. It may take some time to help others in the community understand the value of his elixir. Nevertheless, the hero returns a potent new being, ready to go forth in more effective service of the community.

In a world in which a transition from exponential economic and population growth to a balance with our carrying capacity is necessary to avoid the worst consequences of our overshoot of that capacity, we desperately need heroes and heroines who are committed to the journey and can forge new ways of thinking about the meaning of economic development. They will also need to be able to bring their communities around to new ways of thinking so that together we can design and initiate the changes necessary to mitigate the worst of what is coming, and develop adaptation plans for what cannot be avoided.

One of the important challenges the Hero encounters on his journey is learning that he must face each test and ordeal both as an individual and also as a member of a group, a community which guides him, supports him, and contributes to his success at each stage of his journey. The test is to learn that he alone is responsible for his choices and actions, but that he is also unable to complete the journey alone. In

[139] Murray, W. H., 1951: The Scottish Himalayan Expedition, J.M. Dent & Sons, London, UK.

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our times, the challenges we face are so complex and the stakes are so high that we must do the journey as part of a powerful group of aligned others.

Some interpret the Hero's Journey as something like a video game which will produce a competitive advantage for the successful traveler. While that attitude is unlikely to survive the tests, trials, and ordeals of the journey, it is typical of the outdated, hierarchical, command-and-control approach to leadership, which is a barrier to the collaboration necessary to craft an effective transition to a new economy. Remember, competition is an effective strategy on the left side of the inflection point, but collaboration is the appropriate strategy during and after the transition to the inflection point's right side.

The belief in the superiority of a competitive strategy is often based on a misunderstanding of Darwin's emphasis on the survival of the fittest. Darwin, however, refuted a survival of the fittest type competition as the most effective mechanism of evolution. When asked on his deathbed about his greatest failure, Darwin is reported to have said that he regretted his over-emphasis on survival of the fittest, and his under-emphasis on cooperation as the primary driver of evolutionary success. This perspective is reinforced by Clarence Darrow when he said, "It is not the strongest of the species that survive, nor the most intelligent, but the ones most responsive to change." [140]

Solutions such as a new economy for community resilience require more than community participation. It is more like an investment in a community and all it means – a place, a history, a group of people, a commitment to the future, and a story of who we are. A simple example of such a commitment to community resilience is captured by the following short conversation.

[140] Quoted in "Improving the Quality of Life for the Black Elderly: Challenges and Opportunities", Hearing before the Select Committee on Aging, House of Representatives, September 25, 1987.

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Days End

An old man sat in the courtyard, enjoying the waning warmth of the late autumn sun. He faced the end of his days, and he was ready to move on. But before he could let go, he had one thing left to do.

A woman sat beside him, holding his hand. He was concerned that she would not understand his passage and be sad. So he said:

"We have played an important role in building this community, you and I. We have helped to give it life through our participation, our caring, and our many forms of support. Because of this, we have been happy here and our lives have had meaning.

"The web of life burns strongly here. Over the years a million, million acts of thoughtfulness and support have coalesced into our community. Yet this community that we helped create does not belong to us. We belong to it. We are inextricably woven into its fabric in a way that creates its distinctive heft and pattern and color.

"When I am gone, I will continue to live in the many expressions of this community. When you are lonely, you will find me in the laughter of the children playing in the parks; in the rural village atmosphere combined with great sculpture, theater and music; in the birds and animals that feel at home here; and in the peoples' fierce pride in their transportation networks, schools, food, health care, buildings, businesses and government programs which all work as part of the system.

"That part of me which you see and touch today will become part of the community's living spaces; the smiles of its young lovers on the street; the thunder of the hooves of its running horses; and the wave of its windswept grass. In fact, I will remain not just in these things but in everything you see, hear, touch and feel, for this community lives not in its many parts but in the whole, everywhere.

So know that I am not really gone. You will not be alone. While its many parts may each pass away over time, the community will endure. It is a living thing, an artful expression of the contributions of its many diverse elements, and of ourselves."

Hearing this, the woman's heart swelled with pride in the man at her side, in their partnership, and in the community where they had invested their lives**.**

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The northern Arizona region is the community in which we are investing our lives. We face the unprecedented challenges of transitioning this community away from exponential growth in population, in the economy, and in all their downstream effects, to a new and better economy and a new and better way of living. Individually and through organizations like SEDI we are called to this service and to undertake the hero's journey. Together we must decide how we will answer that call. I hope you will join me on this journey.

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A Story for the Least of Us

As you finish reading, set down this white paper, and return to your daily activities, please remember the following simple story and its reminder of your power to change the world.

Two birds sat on a slender branch of a tree in winter.

"Tell me the weight of a snowflake," a coal-mouse asked a wild dove.

"Nothing more than nothing," was the answer.

"In that case, I must tell you a marvelous story," the coal-mouse said.

"I sat on the branch of a fir, close to its trunk, when it began to snow – not heavily, not in a raging blizzard – no, just like in a dream, without a sound and without any violence. Since I did not have anything better to do, I counted the snowflakes settling on the twigs and needles of my branch. Their number was exactly 3,741,952. When the 3,741,953rd dropped onto the branch – nothing more than nothing, as you say – the branch broke off."

Having said that, the coal-mouse flew away.

The dove, since Noah's time an authority on the matter, thought about the story for awhile, and finally said to herself, "Perhaps there is only one person's voice lacking for peace to come to the world."[141]

[141] Jaworski, *op. cit.,* p 197.

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Appendix A: An Address I Hope President Obama Will Someday Deliver to the Nation[142]

David Korten provides a good summary of what we need to do in the form of a proposed speech by President Obama. This summary covers some of the key elements of both the macro policies and the local programs that will help us make important progress on the road to our great transition to a dynamic equilibrium economy.

My Fellow Citizens:

My administration came to office with a mandate for bold action at a time when our most powerful economic institutions had clearly failed us. They crippled our economy; burdened our federal, state, and local governments with debilitating debts; divided us between the profligate and the desperate; corrupted our political institutions; and threatened the destruction of the natural environment on which our very lives depend.

The failure can be traced directly to an elitist economic ideology that says if government favors the financial interests of the rich to the disregard of all else, everyone will benefit and the nation will prosper. A thirty-year experiment with trickle-down economics that favored the interests of Wall Street speculators over the hardworking people and businesses of Main Street has proved it doesn't work.

We now live with the devastating consequences: a disappearing American middle class and a crumbling physical infrastructure; failing schools; millions without health care; dependence on imported manufactured goods, food, and energy, and even essential military hardware. At the same time it has increased our burden on Earth's living systems and created an often violent competition among the world's peoples and nations for Earth's remaining resources.

Wall Street became so corrupted that its major players no longer trusted one another. The result was a credit freeze that starved legitimate Main Street businesses of the money they needed to pay their workers and suppliers. Pouring still more taxpayer money into corrupted institutions didn't, and won't, fix the fundamental problem.

Corrective action begins with recognition that our economic crisis is, at its core, a moral crisis. Our economic institutions and rules, even the indicators by which we

[142] This proposed speech is taken verbatim from Korten, 2009, *op. cit.,* pp 159-168.

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measure economic performance, consistently place financial values ahead of life values. They are brilliantly effective at making money for rich people. We have tried our experiment in unrestrained greed and individualism. Our children, families, communities, and the natural systems of the Earth have paid an intolerable price.

We have no more time or resources to devote to fixing a system based on false values and a discredited ideology. We must now come together to create the institutions of a new economy based on a values-based pragmatism that recognizes a simple truth: if the world is to work for any of us, it must work for all of us.

We have been measuring economic performance against GDP, or gross domestic product, which essentially measures the rate at which money and resources are flowing through the economy. Let us henceforth measure economic performance by the indicators of what we really want: the health and well-being of our children, families, communities, and the natural environment.

I call on faith, education, and other civic organizations to launch a national conversation to identify the indicators of human and natural health against which we might properly assess our economic performance, taking into account what we know about the essential importance of equity, caring communities, and the vitality, diversity, and resilience of nature to our overall physical and mental health and well-being.

The GDP is actually a measure of the cost of producing a given level of human and natural health and well-being. Any business that sought to maximize its costs, which is in effect how we have managed our economy, would soon go bankrupt – and indeed it has brought our nation to the edge of financial, as well as moral, bankruptcy. We will henceforth strive to grow the things we really want, while seeking to reduce the cost in money and natural resources.

No government on its own can resolve the problems facing our nation, but together we can and will resolve them. I call on every American to join with me in rebuilding our nation by acting to strengthen our families and our communities; to restore our natural environment; to secure the future of our children; and to reestablish our leadership position and reputation in the community of nations.

Like a healthy ecosystem, a healthy twenty-first century economy must have strong local roots and maximize the beneficial capture, storage, sharing, and use of local energy, water, and mineral resources. That is what we must seek to achieve, community by community, all across this nation, by unleashing the creative

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energies of our people and our local governments, businesses, and civic organizations.

Previous administrations favored Wall Street, but the policies of this administration henceforth will favor the people and businesses of Main Street – people who are working to rebuild our communities, restore the middle class, and bring our natural environment back to health. Together we can actualize the founding ideals of our nation as we restore the health of our nation and its economy.

- We will strive for local and national food independence by rebuilding our local food systems based on family farms and environmentally friendly farming methods that rebuild the soil, maximize yields per acre, minimize the use of toxic chemicals, and create opportunities for the many young people who are returning to the land.

- We will strive for local and national energy independence by supporting local entrepreneurs who are creating and growing local businesses to retrofit our buildings and develop and supply renewable energy technologies.

- It is a basic principle of market theory that trade relations between nations should be balanced. So-called free trade agreements based on the misguided ideology of market fundamentalism have hollowed out our national industrial capacity, mortgaged our future to foreign creditors, and created global financial instability. We will take steps to assure that our future trade relations are balanced and fair as we engage in the difficult but essential work of learning to live within our own means.

- We will rebuild our national infrastructure around a model of walkable, bicycle-friendly communities with efficient public transportation to conserve energy, nurture the relationships of community, and recover our farm and forest lands.

- A strong middle-class society is an American ideal. Our past embodiment of that ideal made us the envy of the world. We will act to restore that ideal by rebalancing the distribution of wealth. Necessary and appropriate steps will be taken to assure access by every person to quality health care, education, and other essential services, and to restore progressive taxation, as well as progressive wage and benefit rules, to protect working people. These policies are familiar to older Americans because they are the policies that created the middle class, the policies with which many Americans grew up.

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They were abandoned by ideological extremists to the detriment of all. We will restore them, with appropriate adaptation to current circumstances.

- We will seek to create a true ownership society in which all people have the opportunity to own their own homes and to have an ownership stake in the enterprise on which their livelihood depends. Our economic policies will favor responsible local ownership of local enterprises by people who have a stake in the health of their local communities and economies. The possibilities include locally owned family businesses, cooperatives, and the many other forms of community- or worker-owned enterprises.

My administration will act at the national level to support your efforts to advance these objectives at the local level by engaging in a fundamental reordering of our national priorities.

Because the world can no longer afford war, the foreign policy of this administration will be crafted to build cooperation among people and nations in order to eliminate terrorism and its underlying causes; resolve conflicts through peaceful diplomacy; roll back military spending and demilitarize the economies of all nations; restore environmental health; and increase economic stability.

We will work to replace a global system of economic competition with a global system of economic cooperation based on the sharing of beneficial technology and the right of the peoples of each nation to own and control their own economic resources to meet their needs for food, energy, shelter, education, health care, and other basic needs. We will work to protect the rights and health of working people and the environment everywhere.

An unprecedented concentration of power in transnational corporations that owe no allegiance to any nation, place, or purpose undermines democracy, distorts economic priorities, and contributes to a socially destructive concentration of wealth. Corporate charters give a group of private investors a special legal right to aggregate and concentrate economic power under unified management. The only reason for a government to grant such a charter is to enable a corporation to serve a well-defined public purpose under strict rules of public accountability. I am appointing a commission to recommend legislation that redefines the corporate charter so that each corporation's designated public purpose is specified in its charter and periodically subject to public review.

There will be no more government bailouts of failed corporations during my administration. Any private corporation that is too big to fail is too big to exist. We

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will institute vigorous antitrust enforcement to break up excessive concentrations of economic power and to restore market discipline.

Because absentee ownership invites irresponsibility, we will create incentives for public traded corporations to break themselves up into their component units and to convert to responsible ownership by their workers, customers, or small investors in the communities in which they are located.

Through a public legal process, we will withdraw the charter from, and force the dissolution of, any corporation that consistently fails to obey the law and fulfill a legitimate public purpose.

There is no place in a life-serving twenty-first-century economy for financial speculation, predatory lending, or institutions that exist primarily to engage in these illegitimate practices.

We will act to render Wall Street's casino-like operations unprofitable. We will impose a transactions tax, require responsible capital ratios, and impose a surcharge on short-term capital gains. We will make it illegal for people and corporations to sell or insure assets that they do not own or in which they do not have a direct material interest. The brain power and computing capacity now devoted to trading electronic documents in speculative financial markets will be put to work solving real social and environmental problems, and financing life-serving Main Street enterprises that create living-wage green jobs.

To meet the financial needs of the new twenty-first-century Main Street economy, we will reverse the process of mergers and acquisitions that created the current concentration of banking power. We will restore the previous systems of federally regulated community banks that are locally owned and managed and that fulfill the classic textbook banking function of serving as financial intermediaries between local people looking to secure a modest interest return on their savings and local people who need a loan to buy a home or finance a business.

And last, but not least, we will implement an orderly process of monetary reform. Most people believe that our government creates money. That is a fiction. Private banks create virtually all the money in circulation when they issue a loan at interest. The money is created by making a simple accounting entry with a few computer keystrokes. That is all money really is, an accounting entry.

Many years ago our government gave private banks the exclusive power to create money through the issuance of debt. This means that someone has borrowed and

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is paying interest to a private bank for virtually every dollar in circulation. The more our economy expands, the greater the debt owed to the bankers who create the money essential to economic exchange.

This makes banking a very profitable business, but it creates inherent economic instability as credit expands and contracts. Furthermore, because banks create only the principal loaned, but not the interest, the debt-money system creates an imperative for perpetual economic expansion to generate new loans to create new money at a sufficient rate to allow borrowers to pay the interest due on their loans. This means the economy must grow to keep the money supply from collapsing and assures that as a nation we are mired in ever-growing debt.

U.S. household mortgage and credit card debt stood at $13.8 trillion in 2007, roughly the equivalent of the total 2007 GDP, and much of it was subject to usurious interest rates. The federal debt inherited from the previous administration stood at $5.1 trillion in 2007, before the Wall Street bailout was approved, and it cost taxpayers $406 billion a year in interest alone, the third-largest item in the federal budget after defense and income transfers like Social Security.

This debt hamstrings our government and places an intolerable burden on American families that undermines physical and mental health and family stability. It also creates a massive ongoing transfer of wealth from the substantial majority of households that are net borrowers to the tiny minority of households that are net lenders. This engenders a form of class warfare that has become a serious threat to the security of American's working families.

There is another serious consequence of giving control of our money supply to Wall Street. When Wall Street banks stop making the accounting entries needed to fund Main Street, the real-wealth economy collapses, even though we have willing workers with needed skills who still need to meet the needs of their families, maintain the nation's physical infrastructure, and protect our natural resources. The economy stops solely because no one is making the necessary accounting entries to allow real businesses to function. We cannot allow the moral corruption of Wall Street to bring down our entire economy, indeed our entire nation.

My administration will act immediately to begin an orderly transition from our present system of bank-issued debt money to a system by which money is issues by the federal government. We will use the government-issued money to fund economic-stimulus projects that build the physical and social infrastructure of a twenty-first-century economy, being careful to remain consistent with our commitment to contain inflation.

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To this end I have instructed the treasury secretary to take immediate action to assume control of the Federal Reserve and begin a process of monetizing the federal debt. He will have a mandate to stabilize the money supply, contain housing and stock market bubbles, discourage speculation, and assure the availability of credit on fair and affordable terms to eligible Main Street borrowers.

By recommitting ourselves to the founding ideals of this great nation, focusing on our possibilities, and liberating ourselves from failed ideas and institutions, together we can create a stronger, better nation. We can secure a fulfilling life for every person and honor the premise of the Declaration of Independence that every individual is endowed with an unalienable right to life, liberty, and the pursuit of happiness.

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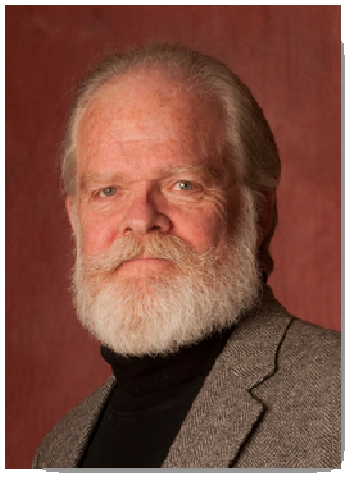
About the Author



Ron Hubert brings to this discussion two relevant areas of training and experience. First, he is a serial business entrepreneur, having founded and/or significantly expanded six businesses in several industries, including strategy consulting, marketing, education, and real estate development. He earned an MBA from USC, and was a professor for 13 years in USC's Graduate School of Business.

Second, since his retirement as a Senior Partner from Deloitte Consulting, Ron earned a Graduate Certificate in Conservation Ecology, and an MS in Environmental Science and Policy, both from NAU where he currently teaches in the School of Earth Sciences and Environmental Sustainability. His master's thesis and ongoing research are on community sustainability programs. Through his strategy consulting company Hozho International, Ron has worked with a wide range of organizations including for-profit firms, philanthropic foundations, universities, non-profits, and government bodies to develop and implement comprehensive sustainability strategies.

Ron is one of the founders, and is currently serving as President and Chairman of the Board of the Sustainable Economic Development Initiative of Northern Arizona (SEDI), and is on the board of the Coconino County Industrial Development Authority. During his career, Ron has served on over 25 corporate and non-profit boards.

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