

Ecological Capitalismⁱ

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Change is neither unusual nor unexpected. The ancient Greek philosopher Heraclitus originated the doctrine of change as a central aspect of the universe. “The only thing constant is change,” is a modern expression of that doctrine. However, some types of change are not usual and constant; some are rare and abrupt. Such change fundamentally reshapes the future. As Peter Drucker, the time-honored writer, scholar, and corporate consultant observed, “Every few hundred years in Western history there occurs a sharp transformation. Within a few decades, society rearranges itself—its worldview; its basic values; its social and political structure, its arts; its key institutions. Fifty years later, there is a new world. We are currently living through just such a transformation.”¹ There is reason to believe the current transformation is at least as great as the Industrial Revolution of the early 1800s and perhaps as great as the Scientific Revolution of the early 1600s. Addressing the challenges of this historic change will require not only a new paradigm for economic development but also new scientific understanding of how the world works and of our place within it.

The current transformation is being driven by a search for the answers to questions of sustainability, and there are growing indications that industrial approach to economic development is simply not sustainable. The industrial era has brought tremendous material benefits to humanity and no one would willingly return to pre-industrial times of widespread and persistent drudgery, hunger, disease, and depravation. However, the environmental movement of the 1960s reflected a growing public awareness that the natural environment was incapable of assimilating the wastes being discharged into air and water by our modern industrial society. Rising energy prices during the 1970s brought similar public attention to the finiteness of the earth’s natural resources. Today, the twin threats of “peak oil” and global climate change are creating a global awakening to the direct linkages between fossil energy depletion and global environmental degradation.

The concept of peak oil relates to the fact that it takes about 30 to 40 years to bring a newly discovered oil field into “peak” production.² At that point, about half of the total quantity of recoverable oil remains in the ground. However, the last half is invariably more difficult and costly to retrieve, and after the peak, annual production invariably declines. U.S. oil discoveries peaked in the late 1930s and 1940s. U.S. oil production peaked in 1971 and has been declining ever since. The peak in global oil discoveries was in 1962. Estimates range from 2005 to 2025 for the peak year of global oil production.³ Other fossil energy sources, including natural gas and coal, have similar patterns of discovery and use and all are expected to peak within the next few decades. In addition, all renewable sources of energy for the future – wind, water, solar –

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will be less plentiful and more costly. The world is not running out of energy, at least not yet, but it is running out of “cheap energy” as production of fossil energy is destined to decline in the decades ahead.

Global climate change is a direct consequence of fossil energy depletion. All fossil energy is biological in origin. It is stored in the bonds that connect molecules of carbon, hydrogen, oxygen, and other elements from the air with nitrogen, phosphorus, potassium, calcium and other elements from the soil in forming the tissues of biological organisms. When the energy is released, these bonds are broken and the various chemical elements, including carbon dioxide and other greenhouse gasses, are released into the environment. This problem is intrinsic for all fossil energy sources – particularly for coal, the most abundant source of remaining fossil energy. Petroleum shortfalls cannot be offset by using coal or any other fossil energy sources without exacerbating the risks of global climate change. The preponderance of scientific evidence indicates that industrial development is a major contributor of greenhouse gasses and that a fundamental change in energy use will be required to avoid potentially catastrophic changes in global climate.⁴

Questions of sustainability are ultimately questions of energy. Everything that is of use to us – our cars, houses, clothes, food – requires energy to make, energy to use; in fact, all material things are simply concentrated forms of energy. All useful human activities – working, managing, thinking – also require energy. Humans are capable of being “useful” only after they have been nurtured, socialized, and educated, all of which require energy.

According to the laws of thermodynamics, energy can neither be created nor destroyed. However, energy inevitably changes in form whenever it is used to do anything useful, which physicists call *work*. Specifically, anytime energy is used to do work, it changes from more-concentrated, more-organized forms to less-concentrated, less-organized forms, as when gasoline explodes in the engine of a car. Each time energy is used and reused, it becomes less concentrated, less organized, and thus less useful. With each use, some of its *usefulness* is lost. This is the essence of the physical law of entropy. Waste is simply energy that isn’t currently useful and pollution is negative energy, in that it requires energy to mitigate. Conserving, reusing, and recycling can improve the efficiency of energy use, but cannot offset the inevitable loss of energy to entropy. The only source of energy available to offset entropy is solar energy – the only truly renewable energy.

The concept of entropy was of little practical or public interest as long as the world had plenty of cheap energy and plenty of places to dump its wastes, which characterized most of the industrial era. In fact, the industrial era has been fueled by cheap energy; first old growth forests, then coal, and for the past century, mostly petroleum. However, the old growth forests have been cut down, the surface veins of coal mined out, and the shallow oil fields pumped dry. In addition, there is nowhere left to dump industrial wastes and pollutants without creating major environmental problems or incurring large costs.

Questions of sustainability are particularly relevant whenever industrial development is linked with the neoclassical concept of free-market capitalism, as is increasingly the case in today’s global economy. While a capitalist economy provides powerful incentives to use and

reuse energy, it provides no incentives to collect and store new solar energy to offset the usefulness of energy that is inevitably lost to entropy. The tremendous productivity of industry within capitalist economies is attributable, at least in part, to the fact that no energy is “wasted” on *work* that has no economic value. Even the solar energy captured through agriculture and forestry has been put in the marketplace for consumption rather than used to regenerate and renew the energy resources needed to sustain future productivity.

The basic problem arises from the fact that economic value is inherently individualistic. Since it accrues to individuals, it must be expected to accrue during the lifetime of the individual decision maker. Investments for the sole benefit of others, including those of future generations, are of no economic value. The diminishing time-value of economic benefits is clearly reflected in market rates of interest, which heavily discount the value of future events. For example, economic benefits expected to accrue a decade in the future are worth less than fifty cents today for each dollar expected later (using a discount rate of seven percent). The ultimate depletion of fossil energy and the related global climate change are of little *economic* importance today because their ultimate impacts are still believed to be beyond the five-to-ten year planning horizons of most corporations. The markets are reflecting only the current resource scarcity, not the ultimate long run consequences of current decisions. It makes no economic sense to invest in resource renewal or regeneration, if the benefits are to accrue to those of future generations. Likewise, it makes no economic sense to invest in societal renewal or regeneration, if the benefits accrue to society in general rather than to the individual investor.

All economic value arises from either natural or human resources – from nature or society. Once the usefulness of nature and society is depleted, there will be no remaining source of economic value. All of today’s service sectors – management, accounting, finance, information – depend on the underlying manufacturing economy, which depends on energy. In addition, all service sector workers require energy, specifically biological energy. Based on everything we know about nature and society, the economy places far too little value on the future to ensure opportunities to meet even the basic needs of future generations. In fact, the issues of peak oil and global climate change cast serious doubts that the future needs of even current generations can be met. Regardless of the timing, an industrial economy driven by a neoclassical capitalist economy quite simply is not sustainable. The industrial era is over. Humanity is in the midst of a great transformation.

A sustainable economy will require a fundamental change in thinking about how the world works and where we humans fit within it. As Albert Einstein once pointed out, “We cannot solve our problems with the same thinking we used when we created them.” Industrial economic development, which has dominated thinking for the past two centuries, is based on a mechanistic view of the world. We humans are but cogs in a giant, complex machine. Sustainable economic development must respect the fact that the world is actually a natural, living ecosystem, of which we humans are a part and within which we are integrally connected. In addressing this new reality, American and global society must fundamentally rearrange itself—its worldview; its basic values; its social and political structure, its arts; its key institutions. Fifty years from now, people will be living in a new and different world.

Industrial economies work like machines. They achieve their impressive productivity by accelerating the extraction of energy from natural and human resources. In the process, however, they also accelerate the *process* of entropy. The ultimate *state* of entropy may be defined as “the degradation of matter and energy; a state of inert uniformity; absence of form, pattern, hierarchy, or differentiation.⁵” Industrial processes are characterized by specialization, standardization, and consolidation of control – the source of their efficiency. Thus, they accelerate the degradation of matter and energy and destroy the form, structure, pattern, organization, and diversity that must characterize all “useful” systems. The surfaces of the Moon or Mars are systems about as close to entropy as most of us have seen. Such are the ultimate consequences of economic industrialization. This is the fundamental flaw in the industrial development paradigm.

Sustainable economies must work like living organisms. Living systems have a unique capacity to collect and store solar energy not only to produce and reproduce but also to offset the energy lost to entropy. Biological systems are characterized by holism, diversity, and interdependence. They are able to collect and use solar energy to restore matter; to offset the loss of form, structure, diversity, and identity; they are capable of tending away from entropy. Living systems are capable of maintaining their capacity for renewal, regeneration, and thus are capable of sustaining their usefulness.

Obviously, an individual life is not sustainable because every living thing eventually dies. But communities of living individuals have the capacity to be productive, and at the same time, devote a significant part of their life’s energy to conceiving and nurturing the next generation, thus sustaining the life of the community. Obviously, in a world of limited natural resources, sustainable reproduction will require an understanding and acceptance of the finite limits of the ability of earth to sustain life, including the necessary diversity of life. But living things – plants, animals, families, communities, societies – are clearly capable of renewal, and regeneration as well as productivity. Living systems are capable of sustainable productivity.

Sustainability does not require that we rely solely on solar energy, only that we capture and store sufficient solar energy to offset the energy inevitably lost to entropy. We humans collect solar energy by using windmills, falling water, and photovoltaic cells. However, it takes energy to build and maintain the structures and mechanisms necessary to collect and store solar energy. Thus, a significant portion of whatever solar energy we collect must be diverted from economic uses to ensure sufficient long run investments in redesigning and rebuilding windmills, dams, photovoltaic cells, and other solar collection systems needed to meet the needs of future generations. And perhaps most important, a significant portion of human energy must be diverted from current economic uses to regenerate and renew families, communities, and civil societies, to ensure that available energy is put to productive rather than destructive uses.

The development of a sustainable economy will require an *ecological* understanding of how the world works and of our place within it. Ecology is most often referred to as a branch of biology that deals with the relationship of living things to their environment and to each other. However, *human* ecology is a branch of sociology that deals with the relations between human beings and their environment. In general, ecology is a study of naturally occurring balanced or harmonious relationships among living things and between living things and their environment. The first principle of ecology is that “everything is connected.” We can never do “just one thing”

because everything we do affects everything else. An ecological worldview is one in which the individual is interconnected and interdependent with all of the other living and non-living elements of the world around them. A sustainable economy must respect the interdependence of the individual economy with the larger society and the still larger natural environment.

Consequently, a sustainable economy must be guided by the principles of healthy, productive natural ecosystems, which include *holism*, *diversity*, and *interdependence*. Ecosystems are more than collections of individual physical and biological elements. They are holistic – relationships matter. Diversity also is essential for the health of natural ecosystems, for renewal, resilience and resistance, regeneration, and adaptation. Interdependence transforms the potential benefits of holism and diversity into positive ecological reality. Interdependent relationships are neither extractive nor exploitative but are mutually beneficial.

The principles of social ecology include *trust*, *kindness*, and *courage*. Social principles arise from a set of common core values, which transcend religion, philosophy, race, nation, and culture.⁶ Trusting relationships are built on the core values of honesty, fairness, and responsibility. When trusts are validated, relationships grow stronger, and when violated, they grow weaker. Relationships of kindness are built on the core values of empathy, compassion, and respect. Sustainable relationships sometimes require mercy rather than justice. Finally, trust and kindness accomplish little without the courage to act. It takes courage to reject deception, inequity, irresponsibility, ruthlessness, and disrespect – to be trusting and kind.

Fundamental economic principles reflect the basic nature of individuals in their pursuit of material self-interests. They include *value*, *efficiency*, and *sovereignty*. Economic value is determined by scarcity, meaning there is less of something available than people need or want. Things of great intrinsic value, such as air, have no economic value as long as they are plentiful. However, people need some things that are scarce and thus have economic value. Economic efficiency reflects economic value relative to the economic costs of the things used to produce it. People must produce things of economic value in order to buy things of economic value. Sustainable communities and societies must make efficient use of their land, people, intellect, energy, and money. Economic sovereignty is the freedom to make informed choices. In a sustainable economy, people must be free to make their own decisions and must accept responsibility for their choices.

A sustainable society must have integrity, meaning completeness, strength, and soundness, which depends on the extent to which the principles of sustainability permeate all of its aspects. Sustainable relationships between people and their natural environment must reflect the principles of social relationships. Environmental pollution and degradation violate the principles of kindness or trustworthiness in relationships among people, both within or among generations. And natural resources must be used efficiently to create things of intrinsic and economic value. Ecological integrity depends on social and economic integrity.

A community, society, and the whole of humanity must be viewed as something more than a collection of people. The relationships among individuals must be holistic, diverse, and interdependent. A sustainable community must be self-renewing and regenerative. Cultural and

social resources must be used efficiently, not just to create economic value but also to create things of intrinsic value. Social integrity depends on ecological and economic integrity.

Finally, a sustainable economy also must be holistic, diverse, and interdependent. A degree of specialization and standardization may be necessary for efficiency, but a sustainable economy must maintain a measure of diversity and its economic relationships must be mutually beneficial, rather than extractive or exploitative. Economic relationships must be based on trust, not just contracts and laws, and must reflect a sense of kindness toward others, including those of the future. Economic integrity is inseparable from ecological and social integrity.

Many people today question whether a capitalist economy can ever be sustainable. Admittedly, the ecological and social risks of capitalism are real. However, no other economic system has been found that can rival its efficiency and productivity in decisions and activities that are legitimately private, personal, or individual in nature. Societies that have tried communism, socialism, and religious theocracies have never been able to meet the physical and material needs of their people. They are ultimately rejected by their people because they are not economically sustainable. Most individual economic decisions do not deprive anyone of their basic social rights or violate any moral imperative. These decisions legitimately belong in the individual, private economy, where there is no logical alternative to capitalism. Capitalism, with all of its inherent risks, is still humanity's best hope for sustainability.

The skeptics are correct in their conclusion that *unbridled, neoclassical* capitalist economies are fundamentally incompatible with economic sustainability. The founders of *classical* economics, including Adam Smith, Thomas Malthus, David Ricardo, and John Stewart Mills, understood the necessity for social and ethical constraints.⁷ Adam Smith wrote in his 1776 classic, *Wealth of Nations*, "improvement in the circumstances of the lower ranks" should never be regarded as "an inconvenience to the society... what improves the circumstances of the greater part can never be regarded as an inconvenience to the whole."⁸ He also wrote that *land*, meaning natural resources, "constitutes by far the greatest, the most important, and the most durable part of the wealth of every extensive country,"⁹ suggesting that the *public* must accept responsibility for protecting their common wealth.

Classical economists understood that the economy must function within the social and ethical bounds of an equitable and just society, if it is to function for the well-being of people in general. The framers of the U.S. Constitution understood that the primary function of government is to ensure an equitable and just society by ensuring the basic rights of the governed. An effective government is necessary to ensure a socially responsible economy. Only over the past few decades, has economic growth has been given precedent over social equity and justice.

The rights of those of future generations were not addressed in either classical economics or in the U.S. Constitution. However, if the people of future have the same rights as those of current generations, as is suggested by sustainability, the rights of future generations must be ensured by people working together for the common good through government. The U.S. Constitution was meant to be a living document, to be amended whenever made necessary by evolving understanding of how the world works and the place with people within it. Sustainable economic

development is possible, logical, and reasonable; it will only require a return to *classical* economics and *classical* democracy.¹⁰

That said, constitutional changes cannot be imposed upon the governed, but instead must reflect the consent of the governed. Eventually, Americans must abandon their pursuit of individual material wealth for the pursuit of a more enlightened concept of self-interest. We are material beings and we need to be concerned about our individual, economic well-being. But we are also social beings; we need other people. We need interpersonal relationships that are not predicated on the expectation of economic benefits. We also are ethical and moral beings. We need to feel a sense of rightness and goodness in the things we do to give purpose and meaning to our lives. Sustainability requires only that we seek a *more enlightened* self-interest. This is not some radical, new idea. In the early 1800s, in his classic book, *Democracy in America*, Alex De Tocqueville referred to it as “self-interest rightly understood”¹¹ and deemed it a necessity of democracy.

Sustainability ultimately is a matter of ethics and morality. We must be willing to treat other people as we would like to be treated if we were in their situation and they were in ours. We must be willing to practice the Golden Rule both within and across generations by doing for those of future generations as we would have them do for us, if we were of their generation and they were of ours. We must come to common understanding that it is not a sacrifice to care for other people or to take care of the earth because these things make our lives better. We must reflect our common sense of rightness and goodness in our relationships with each other and our relationships with the earth.

We are in the midst of a great transformation in human history. We simply cannot continue doing what we have been doing because we are rapidly depleting the natural and human resources upon which the very survival of humanity ultimately depends. Today’s capitalist economies are not sustainable. We must renew and regenerate the resources of nature and society if we are to create a sustainable economy. This renewal and regeneration will require a new ecological understanding of the world and of our place within it.

The changes we are experiencing today are not the usual, expected, or constant changes. We are experiencing the death of an old era and the birth of fundamentally different time in human history. Creating a sustainable economy is no longer an option; it is a necessity, if there is to be a future for humanity. The good news is that together we can build a new sustainable, ecological economy and society, and in so doing, we will create a fundamentally better way of life for ourselves today and for those of the future. Yes, we can do it, but time is running out and we must start now.

End Notes

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³ Robert L Hirsch. "The Inevitable Peaking of World Oil Production." The Atlantic Coast Council of the United States, Bulletin XVI, No 3, October 2005. http://www.acus.org/docs/051007-Hirsch_World_Oil_Production.pdf.

⁴ Al Gore, *An Inconvenient Truth: The Planetary Emergency of Global Warming and What We Can Do About It* (Emmaus, PA: Rodale Press, 2006).

⁵ *Webster's New International Dictionary, Unabridged, 1993 edition*, "Entropy."

⁶ Rushworth M. Kidder, *Moral Courage* (New York: William Morrow, HarperCollins Publishers, 2005), 43.

⁷ Adam Smith and Herbert W. Schneider, *Adam Smith's Moral and Political Philosophy* (New York: Hafner Publishing Company, 1948).

⁸ Adam Smith, 1904, original copyright 1776, *An Inquiry into the Nature and Causes of the Wealth of Nations, fifth edition*, ed. Edwin Cannan (London: Methuen and Co., Ltd), Book I, Chapter 8, paragraph 55, also available at <http://www.econlib.org/library/Smith/smWN.html> .

⁹ Smith, *Wealth of Nations*, I, 11, 237.

¹⁰ John Ikerd, *Sustainable Capitalism: A Matter of Common Sense* (Bloomfield, CT: Kumarian Press, 2004).

¹¹ Alexis de Tocqueville, *Democracy in America*, (New York: Bantam Books, 2000, original copyright, 1835), 646-649.