

## Economic Realities of Sustainable Energy<sup>i</sup>

John Ikerd<sup>ii</sup>

Contrary to what you may believe, we are not here today because the world is running out of cheap energy; we are here because we live in an unsustainable society. If we lived in a sustainable society, we would not be running out of energy. We would have anticipated the decline in fossil energy and would have made provisions for a renewable source of energy, not only to meet the needs for this generation but for all generations to come. Since we do not live in a sustainable society, finding another source of cheap energy, even cheap renewable energy, will not solve our energy problems. A society that relies on extraction and exploitation for its economic productivity can never have enough energy to satisfy its insatiable need for profits and growth.

The specter of neoclassical capitalism is haunting global society today. The haunted are lured by its promise of productivity and great wealth, but they shudder at the thought of its consequences for their natural environments and their historic cultures. With rising energy prices and global warming, people are beginning to awaken to the ecological costs of economic extraction. With growing economic inequity and a world stumbling toward war without end, people are beginning to awaken to the social costs of economic exploitation. More and more people are beginning to realize that something is fundamentally wrong in today's global society.

People know it is ethically and morally wrong to extract and exploit. But, with a global economy dominated by giant publicly held corporations, people are losing their ability to express their ethical and social values in their economic decisions. With growing corporate control of political processes, people are losing their ability to impose ethical and social constraints on the extractive and exploitative practices of global corporations. The neoclassical economists tell us not to worry, that global free markets are the best way to ensure that the needs of the hungry and oppressed are met and to ensure adequate resources for the future. These economists assure us that the invisible hand of capitalism will somehow transform our individual greed into societal good. But even if we don't fully understand the fallacy of this economic propaganda, we know in our hearts that something is terribly wrong.

The most important thing we can do to address the energy dilemma is to help people understand the logical truth of what they know in their hearts to be true. People need to understand why *the current capitalistic system of resource development is not sustainable*. This is not an opinion; it is a fact, a direct consequence of the most basic of physical laws, the laws of thermodynamics.

Sustainability ultimately depends upon our use of energy because anything that is useful in sustaining life on earth ultimately relies on energy. The energy dilemma does not simply affect the obvious things, like energy to fuel for our automobiles or heat our homes. Energy is critical to every aspect of our lives. All material things that are of any use to us – our food, clothes,

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<sup>ii</sup> John Ikerd is Professor Emeritus, University of Missouri, Columbia, MO – USA; author of, *Sustainable Capitalism: A Matter of Common Sense*, <http://www.kpbooks.com>; web site: <http://faculty.missouri.edu/ikerdj/>.

houses, automobiles, – require energy to make and energy to use. All human activities that are of any use to us – working, managing, thinking, teaching, – require human energy. This human energy is extracted from the things people eat, wear, or use. Physical scientists lump all such useful activities together and call them “work.” Thus, all *work* requires energy. And most important, any time we use energy to perform work, some of the *usefulness* of the energy is lost.

In performing work, energy is always changed from more-concentrated to less-concentrated forms. In fact, this natural tendency gives energy its ability to perform work. Material things, such as food, gasoline, wood, plastic, and steel actually are concentrated forms of energy. Matter can be changed into energy, as when we eat food or burn gasoline. Usefulness can also be gained by changing the form of energy, as in using heat to make electricity and electricity to produce light. Whenever energy is used to perform work, it always changes form, becoming more dispersed and disorganized; however, no energy is lost. Matter can be changed to energy and energy changed to matter, but the total energy embodied in matter and energy always remains unchanged. This is the first law of thermodynamics, the law of energy conservation, as in Einstein's famous  $E=MC^2$ . At first, it might seem that we could simply go on recycling and reusing energy forever. If so, sustainability would be inevitable.

However, once energy is used to perform work, before it can be used again, it must be reconcentrated, reorganized, and restored. This basic problem arises because it takes energy to reconcentrate, reorganize, and restore energy. The energy used to reconcentrate, reorganize, and restore energy, is simply no longer available to do anything else. It has lost its usefulness; meaning it has lost its ability to perform work. This is the law of entropy, the second law of thermodynamics; the tendency of all closed systems to tend toward the ultimate degradation of matter and energy; a state of inert uniformity of component elements; an absence of structure, pattern, organization, or differentiation.<sup>1</sup> As a burning log releases radiant energy, for example, the log turns to ashes; its structure, pattern, and organization is lost as it tends toward entropy. The barren surfaces of the Moon or Mars are scenes about as close to entropy as any of us have seen. Since this loss of useful energy is inevitable, it might seem that sustainability is impossible. And in fact, life on earth would not be sustainable without the daily inflow of solar energy. Sustainability ultimately depends upon the use of solar energy to offset the effects of entropy.

The law of entropy is so important that it should be understood by every adult in the world. Everyone needs to understand that all uses of resources inevitably dissipate, disperse, and disorganize the physical energy, or natural capital, embodied in the resources used. Everyone also needs to understand that capitalistic economics are very efficient in using and reusing both natural and human energy, *because they do nothing to offset the inevitable loss of usefulness of energy due to entropy*. It makes no economic sense to invest in renewing resources for the benefit some future generation. Capitalists don't “waste” energy on resource renewal or regeneration. When they use energy from renewable sources, they sell it for current consumption, for profits, rather than invest it to offset the energy lost to entropy. That's why capitalism is so efficient. But, that also is why neoclassical capitalism, by the logic and reason of the most fundamental laws of science, is not sustainable.

Capitalism not only uses up physical energy, it also uses up human energy. The law of entropy applies to social energy as well as physical energy. All human resources – labor, management,

innovation, creativity – are products of social relationships. No person can be born or reach healthy maturity without the help of other people who care about them *personally*, including their families, friends, neighbors, and communities. People must be educated, trained, civilized, and socialized before they can become productive members of complex societies. All organizations – including business organizations and economies – also depend on the ability of people to work together for a common purpose, which in turn depend upon the sociability and civility of the society in which they were raised.

Capitalism inevitably dissipates, disperses, and disorganizes *social* energy because it weakens personal relationships. Social capital is the value embodied in the willingness and ability of people to form and maintain positive personal relationships. However, maximum economic efficiency requires that people relate to each other *impartially*, which means *impersonally*. People must compete rather than cooperate, if market economies are to work efficiently. When people spend more time and energy working – being “productive” – they have less time and energy to spend on personal relationships within families and communities, and social capital is depleted. When people buy things based solely on price rather than buy from people they know and trust, personal relationships within communities suffer from neglect, and social capital is dissipated. Neoclassical capitalism devalues personal relationships and disconnects people and thus dissipates, disperses, and disorganizes social energy.

Capitalistic economies are so efficient because they *use* people to do work but do nothing to restore the social capital needed to sustain positive personal relationships within society. It makes no economic sense for corporations to invest in building relationships within families, communities, or society for the benefit of future generations. It's always more economically efficient to find new people and new communities to exploit. Capitalistic economies don't waste energy by investing in society, and they resist all attempts of people, through government, to tax private enterprises to promote societal well-being. That's why capitalism is so efficient. But, neoclassical capitalism inevitably tends toward *social entropy*; that's why it is not sustainable.

Economies are simply the means by which we deal with individual relationships among people and between people and the natural environment in complex societies. There are obviously too many of us to barter with each other and to produce our own food, clothing, shelter. Economies actually *produce* nothing; they simply transform physical energy and social energy into forms that can be traded or exchanged in *impersonal* marketplaces. All economic capital, meaning anything capable of producing something of economic value, is extracted from either natural capital or social capital. There are no economic incentives to restore or renew either natural or social capital. Thus, when all of the natural and social energy, or capital, has been extracted and exploited, there is no source of economic capital. Without capital, the economy loses its ability to produce anything of economic value; it reaches a state of *economic entropy*.

So where is the hope for the future of humanity? The hope is in developing a new sustainable economy, an economy based on the paradigm of living, biological systems. Living things by nature are self-making, self-renewing, reproductive, and regenerative.<sup>2</sup> Living plants have the capacity to capture, organize, and store solar energy to offset the energy that is inevitably lost in the processes of performing work. All living things have this natural capacity for renewal and regeneration. Obviously, an individual life is not sustainable because every living thing

eventually dies. But, communities and societies of living individuals clearly have the capacity to be productive while devoting a significant part of their life's energy to conceiving and nurturing the next generation, thus sustaining the life of the community and society.

Humans devote large amounts of time and energy to raising families, with very little economic incentive to do so. We are living beings with an innate need to reproduce. Humans also choose to devote significant amounts of time, energy, and money to stewardship of nature and charity within society, even when no economic incentives exist to do so. Humans also devote time and energy to maintaining friendships and relationships within communities, without economic incentives to do so. We are inherently social and ethical beings.

The fundamental problem with today's capitalistic economy is its domination by publicly held corporations, which have no sense of ethical or social responsibility. They are not living beings; they have no family, no community, no heart, and no soul. Living things – plants, animals, families, communities, societies – are clearly capable of permanence as well as productivity. We are allowing our decisions to be made for us by entities that are not human. We must find ways to restore life to our economy, to restore its capacity to be both productive and regenerative, to restore its heart and soul. We must create an economy for life – a sustainable, living economy within a sustainable, moral society. Our willingness and ability to utilize our natural capacity for renewal and regenerations depends upon our willingness to express our humanness.

We humans also have the ability to anticipate events and consequences that we have never before experienced. As far as we know, we are the only species that possesses this capacity for *abstract reasoning*. We can reason that our actions will have specific consequences in the future, not only for ourselves but also for others of both current and future generations. Our concerns for the sustainability of humanity arise from this unique capacity to anticipate a future very different from anything we have experienced.

Today, we humans are behaving like animals. We know what happens to any species of animals, plants, bacteria, or other forms of life that finds itself in a position of dominance in its natural habitat or ecosystem. Eventually, the dominant species expands to a point where it uses up the resources needed to support its own life. When the needs of a dominant species exceed the capacity of its resource base, the species inevitably collapses, to a mere fraction of its peak population or even into extinction. We humans clearly have become the dominant species on earth, our sustaining resources are dwindling, and our habitat now spans the entire global ecosystem. Those who claim that we humans can replace any resource we deplete are ignoring not only the fundamental laws of science but also their innate capacity of abstract reasoning.

Perhaps many people understand the consequences of their actions but simply don't care. We live in a materialistic society. The philosophy of scientific materialism asserts that all natural phenomena, including human life, are nothing more than consequences of physical actions and reactions, occurring according to inviolable physical laws. It denies the existence of purpose or meaning in life or anything else not having palpable material qualities. Materialism “stands in direct opposition to a belief in any of those existences which are vaguely classed as *spiritual*.”<sup>3</sup>

However, thoughtful humans know that life has purpose, otherwise our choices between good and evil or right and wrong would have no meaning. If we are not supposed to do anything in particular, it makes no difference what we do or don't do. We can't prove that life has purpose, we accept it by faith; we believe in the truth of it even though it cannot be proven. Without purpose, life simply makes no sense. We also believe that life was meant to be right and good, and thus, we have a responsibility to choose wisely. This love of life, this belief in its inherent goodness, is reflected in our love of other people and of the earth. We also believe we can learn to make right choices and that life can be good, that we can be happy. We have hope. We are people of faith, love, and hope; we are *spiritual* beings.

We will not find lasting solutions to the energy dilemma until we learn to express our humanness. Through our humanness, we will accept our ethical and social responsibilities to care for other people, including people of future generations. Renewable energy sources – wind, water, photovoltaic – will never be adequately developed until people are willing to accept their social and moral responsibilities to work together for the long run common good of all. But, we will not restore ethics and morality to our society or economy until we reclaim our uniquely human spirituality.

We know what we need to do to reclaim our spirituality; we just need to find the courage to do it. For example, we already know the essential principles that underlie all positive social relationships; we just need to find the courage to live by them. The Institute for Global Ethics has conducted surveys, interviews, and focus groups with people of different cultures around the world, asking people, “What do you think are the core moral and ethical values held in the highest regard in your community?”<sup>4</sup> From a wide variety of responses, five values consistently ranked high in virtually every inquiry. They were honesty, fairness, responsibility, compassion, and respect. In fact, we don't need research; we know in our hearts that we cannot sustain positive personal relationships with others if we are dishonest, unfair, irresponsible, disrespectful, and uncaring.

We can't prove these principles, but we know their truth in our hearts. We are not only reasoning beings; we are also spiritual beings. These principles are spiritual; they cannot be proven, but we know they are true. These principles transcend all enduring religions and philosophies, all races, nationalities, and cultures of the world. As individuals, we obviously hold different values, but we all share a set of common spiritual principles. We simply need to find the courage to act on our common sense of rightness in our relationships.

In a sense, the solution to the energy dilemma will be found *locally*, in our personal relationships with other people, within families and communities. As we find the courage to relate to each other with honesty, fairness, responsibility, compassion, and respect, we will reclaim our sense of community. With a renewed spiritual commitment to ecological and social integrity *locally*, we can begin to reclaim our society and to regain the power needed to wrest control of our government from the corporatists. The economic forces that pull us apart are strong but the forces that draw us back together in families, communities, and cultures relentless – as if we were drawn together by *social gravity*.

We have all of the public institutions in place to reclaim our society and economy, if we can find the courage to do so. We can reclaim the power to restore integrity to our constitution and to our government by recommitting ourselves to equity and justice for all and proclaiming equal rights for all of both present and future generations. We can create a moral and just society, within which a capitalistic economy can function for the good of all people of all times. We can manage our ecological, social, and economic capital, for the well-being of all people of all generations for the benefit of all people of the world. We know what we must do; we need only find the courage to do it. The new economy of sustainable energy must be built upon a spiritual foundation of faith, of hope, and of love. The economic realities of the energy dilemma ultimately are rooted in faith, hope, and love.

## End Notes

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<sup>1</sup> For a more in depth discussion of entropy, see John Ikerd, *Sustainable Capitalism: A Matter of Common Sense*, Chapter 3 (Bloomfield, CT: Kumarian Press Inc., 2005).

<sup>2</sup> For a more in depth discussion of living systems, see Ikerd, *Sustainable Capitalism*, Chapter 5.

<sup>3</sup> Hugh Elliott, "Materialism," in *Readings in Philosophy*, eds. John Herman Randall, Jr., Jestus Buchler, and Evelyn Shirk (New York Harper and Row, Publishers, Inc., 1972), 307.

<sup>4</sup> Rushworth M. Kidder, *Moral Courage* (New York: William Morrow, HarperCollins Publishers, 2005), 43.