

AN APPROPRIATE TECHNOLOGY FUTURE

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In the post September 11, 2001 age, any reference to our collective future is colored by the uncertainty of terrorist attacks by people who fear the power and influence of Western and especially American culture. These "Third World" terrorists focus on symbolic or popular civilian targets and know the vulnerability of such complex technologies as power grid systems, nuclear power plants, and computer networks where well-placed monkey wrenches can disrupt as well as weapons of mass destruction. They often know the West's weaknesses better than many of the target cultures' proponents. Highly technological democratic cultures operate smoothly with the consent of all -- the affluent and the downtrodden, the native born and the alien. If this general consent is missing, the economic future may be in the hands of the ones who vote no, through violent means. Does this become a devilish bargain -- either we are all part of a just world or there will be no world for any of us?

The hard line response. How do we answer the current terrorist threat? Certainly one option is the "war on terrorism." This highly aggressive approach to answering terrorism involves alerting the mightiest military force in the world, organizing and cajoling allies to follow, initiating shooting campaigns to root out the terrorists, and erecting defenses to safeguard our energy and other resource supplies. The argument is that since we depend ever more completely on others for our basics of life, these lifelines of transportation must be secured at all costs. The war approach which is being used both in Afghanistan and Iraq by the Bush administration has proved quite costly in resources and may not succeed in the long run.

Another possible approach. A second approach involves perceiving the 9-11 event not only as a genuine catastrophe, but also a wake-up call to reexamine a wasteful and resource insensitive lifestyle that troubles many conversation-conscious Americans as well as many in other lands. The alternative position stresses that open warfare hardens attitudes of opponents, is extremely costly in time, resources and personnel, and can never really resolve the underlying problems of justice. Besides, the military approach adds to the coffers of well placed defense contractors and corporations while other priorities in the nation or world are neglected at this time. The alternative approach calls for radically sharing resources with those who have little and thus beginning to address the inequalities that cause cultural relations to fester. This approach reduces the need for expensive military security and goes far beyond pure altruism. It does not dismiss the legitimate grievances of the "Third World" radical groups. This second approach if taken seriously would most likely open the way to compassionate dialogue and interaction, not conflict and growing bitterness.

A. Appropriate Technology as a Necessity

A Question: Has the term "sustainability" lost some of its original meaning of retaining, continuing and conserving a practice? If the modern practice of extensive resource use is only temporary due to limits to economic growth, then non-renewable energy practices are not sustainable by their very nature in any sense of the word. At the South African sustainability conference in 2000, corporations vied to show that their profits could continue along with a sustainable economy and environment. The problem is quite complex, for while some corporations can succeed and remain profitable, many cannot when using vast amounts of the world's resources. Profits would quite likely vanish for resource-consuming industries, if they were required to internalize the costs of environmental pollution and depletion of resources. It would be as great a threat to their profitability as would paying a living wage or refuse to hire children. Companies highly involved in exploiting non-renewable energy sources can hardly be regarded as champions of sustainable practices, even when they taut isolated success stories. Should we try to salvage the overused concept of sustainability or look elsewhere for models of a higher quality of life?

Where are we? The prophet Jeremiah two and a half millennia ago told the Israelite community to overcome its false sense of security and face the reality of the political situation. Are we not in somewhat the same situation, being drawn to false security when living unsustainably? Are we damaging or destroying portions of the environment in meeting these lifestyle demands? Are we not restricting our freedoms by building up unrealistic safeguards to inherently fragile systems? Are we spending ourselves into permanent indebtedness with our current national indebtedness approaching a half trillion dollars a year? If a less complex economic structure preserves the environment, enhances freedom at the personal and community levels and conserves our resources, then it is necessary that it be proposed, endorsed and promoted now.

Backing away for a moment. The Athenians in Hellenistic times did not totally recognize human equality, only an equality of their own privileged citizens and not their slaves. These less fortunate people worked so that the citizen lifestyle could be sustained by the privileged class. With all their brilliant minds the partly enlightened Athenian citizens could not see slaves as worthy of the leisure that they themselves possessed. Thus their tools were of limited worth and were highly labor intensive because the tool user was not of their own class. The Greek citizens used the power of steam to drive toys but not to power tools for labor-saving purposes. They were blinded by insensitivity to the needs of others. Today, appropriate technology is available and perceived as adaptable for the needs of all, not just the economic privileged. Appropriate tools may

be used by all citizens in advanced technological nations and their use may be expanded to include all the world.

Either/or. Appropriate technologies become unpopular when the entire machinery of the economic and political system favors current unsustainable practices. Add to this that commercialized media propaganda mills are controlled by economic interests. Modern highly subsidized non-renewable energy technologies along with subsidies to highly mechanized agricultural production have critical advantages in tax write-off and market access denied alternative energy or small farm producers. These other technologies claim a free market place but work against it through a host of economic mechanisms such as price fixing that hurt the small producer and make coexistence as equal partners impossible. Appropriate technology will thrive in a non-monopolistic democratic environment where all people can attain a basic quality of life.

If we maintain our current unsustainable practices, fear will accelerate; standing armies will be required to defend fuel facilities and dwindling oil reserves; prices for basics goods will escalate and poorer nations will grow restless in the cold; and resources for converting to a renewable economy will be diverted to preserving the existing system. Will the blindness of privilege negate a renewable energy economy, which is inherently decentralized and locally based?

1. The Earth's Sake

It is necessary first to save our Earth from the resource snatchers of our age who live by eating, drinking and being merry for tomorrow they will die. Pollution is the sign of utter disrespect for the Earth itself, and most conservation-conscious individuals and groups realize that it should not be tolerated in any form. Greedy extraction of coal, minerals, wood and other resources can cause pollution to the land and neighboring communities. Burning non-renewable resources leads to air and water pollution problems, which have been addressed for over three decades in the more advanced industrialized nations. The carbon economy is reaching its limits and will soon have to be replaced as noted in the voluminous environmental literature.

Environmental problems treated. We have in the course of this book mentioned the areas of blatant disrespect for the Earth: mountain top removal and other surface mining practices for extraction of coal, oil spills on the waterways, nuclear powerplants as temptation for terrorists and in need of decommissioning as their extended lifetimes (from twenty to forty years) near their end, landfill and incinerator waste reduction methods, soil depleted of nutrients through corporate farming methods, pollution in the form of global warming from excess carbon dioxide and other man-made gas emissions, and waterways

contaminated by sewage and industrial pollution. We do not intend to repeat discussions that have been thoroughly aired by this author and others in the past few decades. The Earth needs more than the same pollution, and appropriate technologies such as the various renewable energy applications offer viable and practical alternatives for the sake of the planet.

2. More Freedom and Lack of Restrictions.

Is freedom being eroded in the age of the war on terrorism? Ironically, the very defense of liberty seems to be requiring the erosion of parts of our freedoms that have been the hallmarks of our democratic society. "The Patriot Act," arrests and long-term incarceration of suspected terrorists, surveillance of citizens, broadened subpoena powers of government, airport searches and restrictions on travel by visitors, and many other changes are harbingers of ever more restricted freedom.

Freedom is at stake when inherently insecure institutions and economic systems become tempting targets for the spoilers of our economic and political system. Efforts at security require conformity and added regulations. Continuing to keep inherently unsafe nuclear powerplants in operation requires extra measures that restrict movement of people and use of facilities. What about boats on waterways near such facilities? Air space overhead? Land access roads? Neighboring locations for possible launching of short range rockets? Suspected national or religious groups? One rupture in a somewhat insecure water tank holding spent fuel rods could lead to a meltdown and radioactive contamination of large population areas on a scale greater than that of Chernobyl.

Tool-users freedom. Achieving the basics of life (food, water, housing materials, and fuel) for all the people calls for more than the appropriate technology discussed in the preceding chapters. Political systems, where expanded freedoms are encouraged and guaranteed, are demanded. A grassroots emphasis on satisfying basic needs encourages local community participation and individuals' self-expression and thus nourishes freedom from the ground up. A top-down system where decisions are made at a distance from the grassroots may introduce democratic process but does not nourish such practice except when fostered within genuine local participatory procedures. The total democratic political system is as healthy as local community democracy. Thus the ideal is a federated system of free local communities tied together and networked to central nerve systems by appropriate technologies.

Restrictions to freedom may come so gradually that we hardly notice. However, the *Brave New World* may be far closer than we dare imagine. We take our shoes off at airports, tell which stocks are sold, have our e-mails analyzed, report on what purchases have been made on the credit cards, get fingerprinted on various occasions, tell our social security number to whoever demands it (it was originally considered a matter of government

and you), and have credit ratings distributed whether accurate or not. We are restricted as to how we drive, where we park, and how we recreate. The listing is endless and yet many of us would say that each in turn has some justification. True enough, but the total picture is a cumulative and sorry one. Modern society accepts intrusion and restriction in ways unimaginable a few decades ago.

Instead of affording perfect targets for terrorists, let's accept a fundamental structuring of our lifestyle and accept the need to simplify our lives. For us, appropriate technology is the answer, for it encourages respect for the environment, champions quality of life over quantity of goods, focuses on renewal at the local level, sees value in simple tools, and proclaims the dignity of work. But more so, it allows a life that is not burdened by major restrictions caused by such insecure practices as nuclear power generation and coal extraction and combustion.

3. Less costly.

Do we know the true costs of our lifestyles? This question is quite complex and evades a precise answer. The total cost of a unit of diesel fuel or gasoline or electricity must include the cost of security measures, air pollution consequences and waste disposal costs; and who wants to enter the quicksand of such calculations? Do we really know what it takes to guard the system as well as to drill, process, ship, refine, and distribute the oil -- and then clean up the air pollution resulting from consumption of the fuel product? Are the privileged corporations paying their fair share of this total cost? Privilege is always threatened but most especially when the privilege is a burden on a large number of others. What if all institutions were to pay their fair share of resource extraction and use?

What about costly alternatives? It is the current non-renewable economy that lacks justification, not the need to justify a change to a more sane approach to world resources or the proven technologies already mentioned in this book. Appropriate technology has few or no aftereffects or pollution -- a major cost for non-renewable resources such as the immense hundreds of millions to decommission each nuclear power plant, to haul the contaminated components to a "safe" waste site and to then guard them for possibly millennia (see *Critical Hour*). Part of the cost of the vulnerable oil production system lies in transportation costs, oil spills and the military defense needed to secure the vulnerable infrastructure. Decentralized fuel systems are less costly because they do not require such defensive measures or elaborate transportation systems.

Part of the difficulty in implementing an appropriate technology economy is the lack of a fair playing field. Oil, gas, coal and nuclear power are considered but solar and wind energy applications are not. Where are the financial resources currently

available in the form of tax write-offs, assisting in the planning for future nuclear reactors, grants for clean coal research, oil depots and gas storage facilities, and the list goes on. Many Americans regard the billions of dollars required to rebuild oil-rich Iraq, including immense outlays for military and civilian personnel, as an oil subsidy. It is part of the price of a non-renewable fuel economy, but is seldom included in the cost of oil or the need for renewable energy alternatives.

Appropriate technologies cost less in security, start-up capital, resources, transportation systems, and pollution cleanup. Fiscal responsibility cries out for something more suitable and appropriate than the present non-renewable systems. Susceptibility to terrorism is the newly emerging hidden cost that must be weighed in any national technology strategy, and this extends to computer networks, energy grids, powerplants, and transportation systems. The big is not necessarily better, and this bigness may come with an immense burden attached.

Village economies are less costly. Securing distant sources of fuel and resources is a costly undertaking at this time. When the national defense is factored in, this cost can be enormous. Won't federated village economies require national defense systems? Yes, but if damage to such systems would result in only limited damage to the total nation, the incentive to sabotage the local wind power generator or solar application is small. In contrast, a national economy where large populations depend totally on others for basic raw materials has generated a world dependency guarded by the inflated security of the one trillion dollar annual military budget of the world's armed services. Affluent people are clever at hiding their expenses, and some of these expenses involve the opportunity costs of the world's "have-nots." Must they be expected to await patiently the trickling down of economic benefits? Can we continue to support neo-colonial thought patterns of the past half millennia?

Decentralization, not globalization is the order of the day. Decentralized villages cost less to maintain. What brought down the centralized USSR's Communist regime will surely bring down a global capitalistic system that has an over-dependence on rapidly depleting oil and gas resources. It may just take a little longer. The answer to centralization is the basic village furnishing its basic materials. However, this village does not stand alone, but must be federalized into regions, states, nations and a world. This ideal village requires integration in ever more encompassing networks for reasons of communication, general environmental protection, and commodity exchange in the non-bulk items of life. A self-sustaining local village integrated into a global network must replace the large-scale technological systems that are unsustainable because they are insecure through vulnerability to terrorist attack.

B. Triggering Necessary Changes

The time (kairos) to act is now. This is when we must save the Earth, preserve our freedom, and address the costly and inherently insecure complex technological world maintained by systems that are bankrupting our economy. If human beings are tool users, they are conditioned by the nature of their tools. They can become slaves of their costly conveniences and supposedly labor-saving and security devices. A spacious home surrounded by expensive cars and boats requires major income and attention; a simple habitat equipped with basic necessities exudes the freedom of its residents and allows the precious time needed to reflect.

Appropriate technology is a necessity in our resource limited world. But how will it ever be given a fair hearing in a world dominated by corporation controlled mass media? On the other hand, a dream of a higher quality lifestyle that affords environmental protection, meaningful living at reasonable prices, and security in a fragmented world is not unrealistic. At least three movements or events could trigger a process of healing the Earth: voluntary simplicity; reaction to a catastrophic event; and a systematic but limited regulatory approach.

Voluntary simplicity -- Many people have tried to buck the tide of rampant consumerism through voluntary simplicity. In the years between the rise of environmental consciousness with Rachel Carson's *Silent Spring* in 1962 to the turn of the millennium attempts towards more simple living were made. Examples included the framers of the "Shakertown Pledge," the "Earth Charter" and even our own ASPI "Simple Lifestyle Calendar." I directed a team that wrote one of the first books on the subject, *"99 Ways to a Simple Lifestyle"* in the hope that information would lead to reform and correction. Much of the history of appropriate technology as a movement has been in the area of experimentation and demonstration, and proponents have had a blind faith that showing the good would bring about its adoption. However, this approach is one of a faithful opposition to the present rampant culture that overwhelms the voices of moderation and conservation. Voluntarism may lead the way to genuine reform, but it is proving too slow when urgent changes are required. It has been relegated to an eccentric tolerated sideshow in the onslaught of commercial mass culture.

Catastrophic reaction -- After 9-11 and the terrorist attacks at Bali, Tunisia, Morocco, and the many incidents in Iraq, we do not have to await another single catastrophe in order to move forward. Unfortunately, the manner of reaction is not predictable or easily controllable. Panic sets in. The unwise call out "Crush the terrorists!" Other simultaneously occurring catastrophes such as the AIDS pandemic only fuel the fires of panic. Catastrophic events may lead to change but the change may not proceed along reasonably organized lines -- and that is a major danger in hoping they occur so that the nation may change more quickly. Catastrophes are unexpected and the reaction to them unpredictable. Reasoned voices can be drowned out by the

rhetoric of rapid reaction. Those who desire such events to occur to shake people from their lethargy can become foolhardy. Far from creating a healing atmosphere, the catastrophe could trigger local or regional reactions to the disadvantage of the common good. The Black Death mentality may win the moment and usher in a spasm of even more violent countermeasures than the "Patriot Act."

Regulatory approach -- Environmental protection cannot be achieved solely by voluntary simplicity nor by risking reasoned and orderly reaction to catastrophic events. Somewhere between the leisurely, non-compulsory, voluntary action route and utter repressive measures triggered by catastrophic activity should be a middle road. In essence, a more reasoned and systematic regulatory approach has been happening in post industrialized democracies for the past half century. The difficulty is that such regulatory-related advances are not uniform among all nations. In fact, the United States is not in the forefront of regulatory action in areas of such concern as curbing greenhouse gas emissions to reduce global warming and beginning a program of nuclear powerplant phaseout. Tightening, not loosening, environmental regulations is key to ensuring orderly appropriate technology utilization.

The regulatory approach may prove more daunting than imagined, unless the approach to the solar/wind economy is seen as a win/win situation. A current Bush administration political climate, which is highly influenced by corporate power (especially the oil, coal, gas and nuclear interests) and media lap dog acceptance and encouragement, is not ideal for this orderly regulatory approach. In fact, globalization with its liberalizing of trade and softening of environmental restrictions works in the opposite direction. Regulatory legislation achieved in such areas as endangered species protection, enactment of air and water standards, toxic substance control, and land conservation measures may be weakened at the very moment that it should be strengthened. Environmental efforts require champions, and the truth is that the Earth itself has no special interest or constituency group outside of the generic "us."

C. Global Community

Having accepted a regulatory approach, where does it fit into a picture of a locally-based appropriate technology? Voluntary imitation of one locality's success by an adjacent locality has a good effect, but urgency demands more deliberate speed. Mere local community regulations do not extend to distant fragile and sensitive areas and so there is a need for regional and national policy planning and implementation.

Starting from home. We start from home but do not end there. We need points of origin to orient us. The place local community is important for introducing and testing appropriate technologies -- and these technologies, in turn, help us value and define our homes as our sources of direction. But our concept of home includes a larger picture, a broader basis for viewing the world.

As social beings we are polymorphic; we belong to numerous communities (religious, political, economic, social, and professional). Furthermore, we belong to communities of communities. We seek to expand beyond our locality for it is good to touch bases and communicate with others, both for our own growth and theirs, for we all have much in common including our destinies. We cannot go it alone. All creatures are on this planet together; merely ensuring a higher quality of life for some people at the expense of others is ultimately destabilizing and unsustainable.

Appropriate technology is not selfish. How can people continue to prolong or countenance a practice that will be for a limited good when others desperately seek the basics of life? Just as Lincoln realized that our nation could not remain half slave and half free, we are coming to the insight that our world is one community and cannot continue in a healthy manner half (really one-tenth) haves and half (really nine-tenths) have-nots. Authentic sustainability means regarding the welfare and harmonious life of the greater whole. The planetary community is a global village, an organic whole. For cells to remain healthy, neighboring cells must be free of cancer. Over-affluence is cancerous and robs other normally healthy cells of their nutrients. The healthy whole cannot tolerate destitute cells or over-growing cells. Neither are healthy. Appropriateness is the way to health.

People friendly technologies are inclusive. Appropriate technology can be handled easily by individuals, is affordable because of its inherent security, is ultimately ecological in a global sense, and enhances the broader community of beings. A people-friendly technology improves the psychological health of the individual. The healthfulness is carried over to others in the family and immediate neighborhood reducing stress and improving the quality of life. Just as harmful practices such as smoking and excessive drinking can damage individual users, so a harmful global technology can damage the world community. Just as healthy conditions can improve an individual body, so healthy practices can extend out to other people for the benefit of a larger population.

Example. The most defining event at our family farm right after the Second World War was being on the short list to receive a scarce tractor due to hiring a veteran. In 1947 this tractor changed all aspects of life, as it replaced the horses. It allowed the working day to extend to darkness and beyond; it withdrew the resting periods that were required for each horse-drawn wagon of hay, tobacco or corn; it transformed the farm from being a source of feed (hay and corn) to being a participant in a broader cash economy required for purchase of expensive fuel and added machinery; it removed the kinder and gentler approach found in use of and care for horses in farm work. Yes, the tractor did seem appropriate because it was more convenient, but something was lost that was replaced by often overlooked agrarian stress. That

post-war period with its technological choices foreshadowed the demise of family farms some fifty years later.

Seeking solutions. While not advocating a return to the horse-age as such, I have witnessed the change in my lifetime to something less good and needing compensation in a quest for more appropriate technological applications. The Amish lifestyle has a beneficial point that is worth noting: it undoubtedly is less stressful than that of the migrant workers on a highly mechanized corporate farm. Being people-friendly does not just apply to the handler of the horse or to the worker hoeing in the field; it embraces entire groups of people. The more suitable approach is that which allows for a better and higher quality of lifestyle, not for the achievement of more work in a profit driven economy.

Including people. While I was first writing this essay a trade conference was occurring in Mexico. The cotton farmers of Mali and Chad were begging that the subsidies given to the larger farmers of the United States be reduced so that Africans can stay in business. The people-friendly but simple methods of the African farmer, known to grow a higher quality fiber, are only as good as the fair markets for his product. This cotton grower seeks a fair return and a living through his labor, not a handout or an aid package. The tools he uses do not stand alone; they are part of a system and that is why individual well-being is relative to the systems and technologies involved. No matter how friendly is the tool, appropriate technology works best within a fair and just economy and political system, and the total interaction of production and marketing is part of the global well-being that is sought by all cotton farmers as well as by the general public.

Deeper questions. Isn't it more friendly for the African cotton-grower to produce materials for his local economy instead of for a distant market? Wouldn't friendly technologies work best when focused on local needs, whether the family farm is in Kentucky or in Chad and Niger? The move to ever more globalized markets may be tempting, but it must involve personal sacrifice -- and often from the backs of the poor. On the other hand, a local focus is ultimately a return to what is more satisfying to the individual, family and neighbors. The possibility of more appropriate technological applications stands out as a beckoning call to the larger world community. The deeper question involves curbs on globalization practices precisely because they weaken local personal and community relationships.

Invitation to a New Vision

Appropriate technology raises issues dealing with world economic, ecological, social community and psychological relationships. It may prove to be a powerful tool which defines our way of approaching the world in which we live. But such technologies require reflection as to how to use them wisely and well. They present a promise and a peril. If misused they are no

better than what they replaced; if used properly they are liberating. Political upheavals have not guaranteed liberated populations, as we know full well from the Russian and the Chinese revolutionary examples. The new vision must be liberating but non-violent, realistic about costs and yet sacrificing, willing to recognize experts but not elitist, mindful of complex technological vulnerabilities and yet willing to take risks, and open to treating all so-called "Third World" people as equals, not mere carriers of the wealthy. All are called to be appropriate technologists, for these applications are universal in scope, spiritual in depth and most suitable to global cooperation. Appropriate technology is truly a goal worth pursuing, a tool worth using, and a hope for a safe, ecological and free future society.