The Unnecessary Energy Crisis: How to Solve It Quickly

T. E. Bearden, LTC, U.S. Army (Retired)
CEO, CTEC Inc.
Director, Association of Distinguished American Scientists (ADAS)
Fellow Emeritus, Alpha Foundation's Institute for Advanced Study (AIAS)
June 12, 2000

Introduction

The World Energy Crisis

The world energy crisis is now driving the economies of the world nations. Presently there is an escalating worldwide demand for electrical power and transportation, much of which depends on fossil fuels and particularly oil or oil products. The resulting demand for oil is expected to increase year by year. Recent sharp rises in some U.S. metropolitan areas included gasoline at more than $2.50 per gallon already.

At the same time, it appears that world availability of oil may have peaked in early 2000, if one factors in the suspected Arab inflation of reported oil reserves. From now on it appears that oil availability will steadily decline, slowly at first but then at an increasing pace.

Additives to aid clean burning of gasoline are also required in several U.S. metropolitan areas, increasing costs and refinery storage and handling.

The increasing disparity between demand and supply — steadily increasing demand for electricity using oil products versus decreasing world supplies of oil, with other factors such as required fuel additives — produces a dramatically increasing cost of oil and oil products. Further, newer supplies of oil must be taken by increasingly more expensive production means.

At the same time, the burgeoning populaces of the major petroleum producers — and their increasing economic needs —press hard for an increasing inflation of oil prices in order to fund the economic benefits.

As an example, it appears that Saudi moderation of OPEC is vanishing or has already vanished. The increasing demands of the expanding Saudi Royal Family group and the guaranteed benefits to the expanding populace have overtaken and surpassed the present Saudi financial resources unless the price of OPEC oil is raised commensurately.

The Federal Reserve contributes directly to the economic problem in the U.S., since it interprets the escalating prices of goods and services (due to escalating energy prices) as evidence of inflation, and will continue to raise interest rates to damp the economy, further adding to suppression factors weighing on business, employment, and trade. The Fed has already increased interest rates six times in one year as of this date.

International Trade Factors

Under NAFTA, GATT, and other trade agreements, the transfer of production and manufacturing to the emerging nations is also increasing and trade barriers are lowered. Some 160 emerging nations are essentially exempt from environmental pollution controls, under the Kyoto

accords. In these nations, electrical power needs and transport needs are increasing, and will continue to increase, due to the increasing production and movement of goods and the building of factories and assembly plants. Very limited pollution controls — if any — will be applied to the new electrical plants and transport capabilities to be built in those exempted nations.

The transfer of manufacturing and production to many of these nations is a transfer to essentially "slave labor" nations where workers have few if any benefits, are paid extremely low wages, work long hours, and have no unions or bargaining rights. The local politicians can usually be "bought" very cheaply so that there are also no effective government controls. This has set up a de facto return to the feudalistic capitalism of an earlier era when enormous profits could be and were extracted from the backs of impoverished workers, and government checks and balances were nil.

The personal view of this author is that NAFTA, GATT, and Kyoto were set in place for this very purpose. As the transfer builds for the next 50 years, it involves the extraction of perhaps $2 trillion per year, from the backs of these impoverished laborers. It would not appear accidental that Kyoto removed the costly pollution control measures from this giant economic buildup that would otherwise have been required. The end result will be increased pollution of the biosphere on a grand scale.

Ironically, the Environmental Community itself was deceived into supporting the Kyoto accords and helping achieve them, hoping to put controls on biospheric pollution worldwide. In fact the Kyoto accords will have exactly the opposite effect.

Resulting World Economic Collapse

Bluntly, we foresee these factors — and others {1} not covered — converging to a catastrophic collapse of the world economy in about eight years. As the collapse of the Western economies nears, one may expect catastrophic stress on the 160 developing nations as the developed nations are forced to dramatically curtail orders.

International Strategic Threat Aspects

History bears out that desperate nations take desperate actions. Prior to the final economic collapse, the stress on nations will have increased the intensity and number of their conflicts, to the point where the arsenals of weapons of mass destruction (WMD) now possessed by some 25 nations, are almost certain to be released. As an example, suppose a starving North Korea {2} launches nuclear weapons upon Japan and South Korea, including U.S. forces there, in a spasmodic suicidal response. Or suppose a desperate China — whose long range nuclear missiles can reach the United States — attacks Taiwan. In addition to immediate responses, the mutual treaties involved in such scenarios will quickly draw other nations into the conflict, escalating it significantly.

Strategic nuclear studies have shown for decades that, under such extreme stress conditions, once a few nukes are launched, adversaries and potential adversaries are then compelled to launch on perception of preparations by one's adversary. The real legacy of the MAD concept is this side of the MAD coin that is almost never discussed. *Without effective defense, the only chance a nation has to survive at all, is to launch immediate full-bore pre-emptive strikes and try to take out its perceived foes as rapidly and massively as possible*.

As the studies showed, rapid escalation to full WMD exchange occurs, with a great percent of the WMD arsenals being unleashed . The resulting great Armageddon will destroy civilization as we know it, and perhaps most of the biosphere, at least for many decades.

My personal estimate is that, beginning about 2007, on our present energy course we will have reached an 80% probability of this "final destruction of civilization itself" scenario occurring at any time, with the probability slowly increasing as time passes. One may argue about the timing, slide the dates a year or two, etc., but the basic premise and general time frame holds. We face not only a world economic crisis, but also a world destruction crisis.

So unless we dramatically and quickly solve the energy crisis — rapidly replacing a substantial part of the "electrical power derived from oil" by "electrical power freely derived from the vacuum" — we are going to incur the final "Great Armageddon" the nations of the world have been fearing for so long. I personally regard this as the greatest strategic threat of all times — to the United States, the Western World, all the rest of the nations of the world, and civilization itself {3} {4}.

What Is Required to Solve the Problem

To avoid the impending collapse of the world economy and/or the destruction of civilization and the biosphere, we must quickly replace much of the "electrical energy from oil" heart of the crisis at great speed, and simultaneously replace a significant part of the "transportation using oil products" factor also.

The technical basis for that solution and part of the prototype technology required, are now at hand. We discuss that solution in this paper.

To finish the task in time, the Government must be galvanized into a new Manhattan Project {5} to rapidly complete the new system hardware developments and deploy the technology worldwide at an immense pace.

Once the technology hardware solutions are ready for mass production, even with a massive worldwide deployment effort some five years are required to deploy the new systems sufficiently to contain the problem of world economic collapse. This means that, by the end of 2003, those hardware technology solutions must have been completed, and the production replacement power systems must be ready to roll off the assembly lines en masse.

The 2003 date appears to be the critical "point of no return" for the survival of civilization as we have known it.

Reaching that point, say, in 2005 will not solve the crisis in time, and the collapse of the world economy as well as the destruction of civilization and the biosphere will still almost certainly occur, even with the solutions in hand.

A review of the present scientific and technical energy efforts to blunt these strategic threat curves, immediately shows that all the efforts (and indeed the conventional scientific thinking) are *far too little and far too late*. Even with a massive effort on all of the "wish list" of conventional projects and directions, the results would be totally insufficient to prevent the coming holocaust.

As one example, the entire hot fusion effort has a zero probability of contributing anything of significance to the energy solution in the time frame necessary. Neither will windmills, more dams, oil from tar sands, biofuels, solar cells, fuel cells, methane from the ocean bottom, ocean-wave-powered generators, more efficient hydrocarbon combustion, etc. All of those projects are understandable and "nice", but they have absolutely zero probability of solving the problem and preventing the coming world economic collapse and Armageddon.

These conventional approaches are all "in the box" thinking, applied to a completely "out of the box" problem unique in world history.

The conventional energy efforts and thinking are essentially "business as usual but maybe hurry a little bit." They constitute a major part of the problem contributing to the final Armageddon that is hurtling toward us.

If we continue conventionally and with the received scientific view, even with massively increased efforts and a Manhattan Project, we almost certainly guarantee the destruction of civilization as we know it, and much of the biosphere as well.

Bluntly, the only viable option is to develop systems which extract energy directly from the vacuum and are therefore self-powering, like a windmill in the wind {6}. Fortunately, analogous open electrical systems far from thermodynamic equilibrium with the active vacuum are permitted by the laws of physics, electrodynamics {7} and thermodynamics {8}. They are also permitted by Maxwell's equations, prior to the arbitrary curtailment by Lorentz symmetrical regauging. That little mathematical trick by Lorentz made the mathematics much easier to solve (for the "subset" of the Maxwell-Heaviside systems retained).

However, the *bad news* is that it also just arbitrarily discarded all EM systems far from thermodynamic equilibrium (i.e., asymmetrical) with respect to their vacuum energy exchange.

The good news *is that we now know how to easily initiate continuous and powerful "electromagnetic winds" from the vacuum at will. Once initiated, each free EM energy wind flows continuously so long as the simple initiator is not deliberately destroyed.*

So we have already solved the first half of the energy crisis problem {9} {10}: *We can produce the necessary "EM energy wind flow" in any amount required, whenever and wherever we wish, for peanuts*.

A tiny part of the far frontier of the scientific community is also now pushing hard into catching and using this available EM energy from the vacuum {11}. However, they are completely unfunded and working under extremely difficult conditions {12}. In addition, there are more than a dozen appropriate processes already available (some are well-known in the hard literature), which can be developed to produce the new types of electrical energy systems {13}.

What Must Be Done Technically

We have about two and a half years in which to develop several different types of systems for the several required major applications — particularly the following:

(1) self-powering open electrical power systems extracting their electrical energy directly from the active vacuum and readily scalable in size and output,

(2) burner systems {14} to replace the present "heater" elements of conventional power plants, increasing the coefficient of performance (COP) {15} of those altered systems to COP>1.0, and perhaps to COP = 4.0,

(3) specialized self-powering engines to replace small combustion engines {16},

(4) self-regenerating, battery-powered systems enabling practical electric automobiles, based on the Bedini {17} process,

(5) Kawai COP>1.0 magnetic motors {18}with clamped feedback, powering themselves and their loads,

(6) magnetic Wankel engines {19} with small self-powering batteries, which enable a very practical self-powering automotive engine unit for direct replacement in present automobiles,

(7) permanent magnet motors such as the Johnson {20} approach using self-initiated exchange force pulses {21} in nonlinear magnetic materials to provide a nonconservative field, hence a self-powering unit,

(8) iterative retroreflective EM energy flow systems which intercept and utilize significant amounts of the enormous Heaviside dark energy {22} which surrounds every electrical circuit but is presently ignored,

(9) Iterative phase conjugate retroreflective systems which passively recover and reorder the scattered energy dissipated from the load, and reuse the energy again and again {23},

(10) Shoulders' charge cluster devices {24} which yield COP>1.0 by actual measurement,

(11) self-exciting systems using intensely scattering optically active media and iterative asymmetrical self-regauging {25}{26}{27} {56},

(12) true negative resistors such as the Kron {28} and Chung {29} negative resistors, the original point-contact transistor {30} which can be made into a negative resistor, and the Fogal negative resistor semiconductor, and

(13) overunity transformers using a negative resistor bypass across the secondary, reducing the back-coupling from secondary to primary and thus lowering the dissipation of energy in the primary {31}.

What Must Be Done for Management and Organization

To meet the critical 2003 "point of no return" milestone, the work must be accomplished under a declared National Emergency and a Presidential Decision Directive.

The work must be amply funded, with authority — because of the extreme emergency — to utilize any available patented processes and devices capable of being developed and deployed in time, with accounting and compensation of the inventors and owners separately.

As an example, two of the above mentioned devices — the Kawai engine and the magnetic Wankel engine — can be quickly developed and produced en masse. However, they have been seized by the Japanese Yakuza {32} {33} {34} and are being held off the world market. The two devices are quite practical and can be developed and manufactured with great rapidity. As an example, two models of the Kawai engine were tested by Hitachi to exhibit COP = 1.4 and COP = 1.6 respectively. Use of these two inventions, under U.S. Government auspices, will greatly contribute to solving a significant portion of the transportation power problem, at low risk for this part of the solution. Use of them cannot be obtained by normal civil means, due to the involvement of the Yakuza.

The *technical* part of the project to solve the energy crisis is doable in the required time — but just barely, and only if we move at utmost speed.

Thanks to more than 20 years work on unconventional solutions to the problem, much of the required solution is already in hand, and the project can go forward at top speed from the outset.

The remaining *managing and organizing* problem is to marshal the necessary great new Manhattan Project as a U.S. government project operating under highest national priority and ample

funding. The Project must be a separate Agency, operating directly under the appropriate Department Secretary and reporting directly to the President (through the Secretary) and to a designated Joint Committee of the Senate and the House.

The selection of the managers and directors must be done with utmost care, else they themselves will become the problem rather than the solution. We strongly stress that here even the most highly qualified managerial scientist may have to be disqualified because of his or her own personal biases and dogmatic beliefs. Leaders and scientists are required who will run with the COP>1.0 ball on a wide front.

The compelling authority to assign individual tasks to the National Laboratories and other government agencies is required, but under no circumstances can the project be placed under the control of the national laboratories themselves. Those laboratories such as Los Alamos National Laboratory, Lawrence Livermore National Laboratory, and Oak Ridge National Laboratory are far too committed to their entrenched Big Science projects and the resulting bias against electrical energy from the vacuum.

Assigning management of the project to them would be setting the foxes to minding the hen house, and would guarantee failure. Those agencies whose favored approaches are *responsible* for the present energy crisis, cannot be expected to *direct an effective solution to it* that is outside their managerial and scientific ansatz and totally against their institutional and professional biases. If they are allowed to direct the project, then implacable scientists who adamantly oppose electrical energy from the vacuum from the getgo, will hamstring and destroy the project from its inception.

Not only will they fiddle while Rome burns, but they will help burn it.

Enormous EM Energy Flow Is Easily Extracted From the Active Vacuum

At any point and at any time, one can freely and inexpensively extract enormous EM energy flows directly from the active vacuum itself.

There is not now and there never has been a problem in readily obtaining as much electromagnetic energy flow from the vacuum as we wish. Anywhere. Anytime. For peanuts.

Every electrical power system and circuit ever built already does precisely that {35}{36}. But almost all the vast EM energy flow that the present flawed systems extract from the vacuum is unaccounted and simply wasted. It is wasted by the conventional, seriously flawed circuits and systems designed and built by our power system scientists and engineers in accord with a terribly flawed 136-year old set of electrodynamics concepts and foundations. Specifically, it is wasted because Lorentz discarded it a century ago {36}, and since then everyone has blindly followed Lorentz's lead.

Our electrical scientists and engineers have not yet even discovered how a circuit is powered! They have no valid concept of where the electrical energy flowing down the power line actually *comes from*. They do not *model* the interaction that provides it {37}, in their theoretical models and equations. This vast scientific "conspiracy of ignorance" is completely inexplicable, because the actual source of the EM energy powering the external circuits has been known (and rigorously proven) in particle physics for nearly half a century! But *it has not yet even been added into the fundamental electrical theory used in designing and building power systems*.

We have a *scientific mindset problem* of epic proportions, and scientific negligence and electromagnetics dogma of epic proportions. I sometimes refer to this as an unwitting "conspiracy of ignorance", where I use the word "ignorance" technically as meaning "unaware". We certainly do not intend the phrase to be pejorative.

So we do not have an *energy* problem per se. We have an unwitting *conspiracy of scientific ignorance* problem.

Because of its bias, our electrical scientific community also strongly resists updating the 136-year old electrodynamics foundations even though much of it is known to be seriously flawed and even incorrect {38} {39}. Indeed, organized science has always fiercely resisted strong innovation. As Max Planck {40} so eloquently put it,

> *"An important scientific innovation rarely makes its way by gradually winning over and converting its opponents: it rarely happens that Saul becomes Paul. What does happen is that its opponents gradually die out, and that the growing generation is familiarized with the ideas from the beginning."*

Arthur C. Clarke {41} expressed it succinctly for our more modern scientific community, as follows:

> *"If they [quantum fluctuations of vacuum] can be [tapped], the impact upon our civilization will be incalculable. Oil, coal, nuclear, hydropower, would become obsolete — and so would many of our worries about environmental pollution." "Don't sell your oil shares yet — but don't be surprised if the world again witnesses the four stages of response to any new and revolutionary development: 1. It's crazy! 2. It may be possible —so what? 3. I said it was a good idea all along. 4. I thought of it first."*

With respect to extracting and using EM energy from the vacuum, our present scientific community is mostly in Clarke's phase 1, with a few scientists in phase 2 who surmise that "it may perhaps be the science of the next century."

We do not have a century remaining. We have two and a half years.

For nearly half a century (i) the active vacuum, (ii) the vacuum's energetic interaction with every dipole, and (iii) the broken symmetry of the dipole in that energetic interaction {44} have been known and proven in particle physics. These *proven* COP>1.0 vacuum energy mechanisms have not been incorporated into the electrodynamic theory used to design and build electrical power and transportation systems. We are still waiting for the "old scientific opponents" — adamantly opposed to the very notion of electrical energy from the vacuum — to "die off and get out of the way."

Hence our universities, the National Science Foundation, the National Academy of Science, the National Laboratories, etc. have not taken advantage of the enormous EM energy so universally available from the active vacuum, and in fact universally and copiously extracted from the vacuum by every EM system today — and wasted. Indeed, present organized science will not fund and will not tolerate research which would violate the presently decreed view of power systems and their functioning.

So our present organized scientific community will strongly resist funding of a vigorous program to gather all this *proven, known physics* together and rapidly use it to change and update (modernize) the terribly flawed EM theory and the design of electrical power systems. Most scientists attempting to do this research have had to proceed on their own. They have undergone vicious and

continual *ad hominem* attacks, lost research funds and tenure, been unable to get their papers published, and in fact risked being destroyed by the scientific community itself {12}.

The bottom line is this: *Left to sweet reason, because of the depth of its present bias the scientific community is totally incapable of reacting to the problem in time to prevent the destruction of civilization. If we wish to survive, government will have to directly force the scientific community to do the job, over careers and "dead bodies" (so to speak) if necessary.*

But first the government itself must be motivated to do so.

That is a task that only the environmental community can do in the extremely short time in which it must be accomplished. So it would seem that the most urgent task of all, is to educate and wake up the environmental community that it has been "had", and it has been "had" since the beginning.

Understanding What Powers Electrical Circuits

Let us cut through the scientific errors in how electrical power systems are presently viewed: *Batteries and generators themselves do not power circuits*. They never have, and they never will. They dissipate their available internal energy {42} to do one thing and one thing only: *forcibly separate their own internal charges to form a "source dipole"* {43}. Once the dipole has been formed, *the dipole* directly extracts electromagnetic energy from the active vacuum {44}, pouring the extracted EM energy out from the terminals of the battery or generator.

Batteries and generators make a dipole, nothing else. All the fuel every burned, the nuclear fuel rods ever consumed, and chemical energy ever expended by batteries, did nothing but make dipoles. None of all that destructive activity, of itself, ever added a single watt to the power line.

Once made, *the dipole* then extracts EM energy from the seething vacuum, and pours it out down the circuit and through all surrounding space around the circuit {45}. A little bit of that energy flow strikes the circuit and enters it by being deflected (diverged) into the wires {46}. That tiny bit of intercepted energy flow that is diverged into the circuit, then powers the circuit (its loads and losses) {47}.

All the rest of that huge energy flow around the circuit, just roars on off into deep space and is wasted.

The Dipole Extracts Enormous Energy from the Vacuum

The outflow of EM energy extracted from the vacuum by a small dipole is enormous. It fills all space surrounding the attached external circuit (e.g., surrounding the power lines attached to a power plant generator) {45}. In the attached circuits, the electrical charges on the surfaces of the wires are struck by the mere edge of the violent flow of EM energy passing along those surfaces. The resulting tiny "intercepted" part {46} of the EM energy flow is deflected into the wires, very much like placing one's hand outside a moving automobile and diverting some of the wind into the car. This deflected energy that enters the wires is the Poynting component of the energy flow. It is *not* the entire EM energy flow by any means, but only a very, very tiny component of it {47}.

Only that tiny bit of the energy flow that is actually diverged into the wires, is used to power the circuit and the loads. All the rest of the enormous energy flow that is present and available outside the circuit, is just ignored and wasted.

A nominal 1-watt generator is actually one whose external circuit can "catch" only 1 watt of its output. The generator's actual *total* output — in the great flow which fills all space around the external circuit and is not intercepted and used — is something on the order of 10 trillion watts!

Our Scientists and Engineers Design Dipole-Destroying Systems

Here is the most inane thing of all. Precisely half of the small amount of energy that *is* actually caught by the circuit, is used to destroy the dipole! That half of the intercepted energy does not power the load, nor does it power losses in the external circuit. Instead, it is used to directly scatter the dipole charges and destroy the dipole.

Our scientists and engineers have given us the ubiquitous closed current loop circuit {48}, *which destroys the dipole faster than it powers the load*. In short, the scientists and engineers design and build only those electrical power systems that "continuously commit suicide" by continuously destroying the source dipole that is extracting the vacuum energy and emitting it out along the circuit to power everything in the first place.

So now we have the real picture.

Every electrical load ever powered, and every load powered today, has been and is powered by electromagnetic energy extracted directly from the seething vacuum by the source dipole in the generator or battery.

But our scientists and engineers design and build electrical power systems that only intercept and use a tiny fraction of the vast EM energy flow available. They also only design and build systems that destroy their source dipole faster than they power their loads.

If one does not destroy the dipole once it is made, it will continue to freely extract copious EM energy flow from the vacuum, indefinitely, pouring out a stupendous flow of EM energy.

As an example, some dipoles in the original matter formed in the Big Bang at the beginning of the universe, have been steadily extracting EM energy from the vacuum and pouring it out for about 15 billion years.

The energy problem *is not* due to nonavailability of copious EM energy flows at will, as much as one wishes, anywhere, anytime.

The energy problem *is* in (i) intercepting and utilizing more of the vast energy flows made available by the common dipole, and (ii) doing so without using the present inanely designed circuits. These circuits use half their collected energy to destroy the dipole that is extracting the energy flow from the vacuum in the first place!

Ignoring the Vacuum as the Source of Electrical Energy in All Circuits

In their conventional theoretical models, our present electrical power system scientists and engineers do not even include the vacuum interaction or the dipole's extraction of EM energy from the vacuum. They simply ignore — and do not model — what is really powering every electrical system they build.

Consequently, we reiterate that our electrical scientists have never even discovered how an EM circuit is powered — even though it has been discovered and known for nearly 50 years in particle physics.

All the hydrocarbons ever burned, all the water over all the dams ever built, all the nuclear fuel rods ever expended in all the nuclear power plants, added not a single watt to the power line.

Instead, all that expense, effort, and pollution and destruction of the biosphere was and is necessary in order to keep adding internal energy to the generator — so that it can keep continually rebuilding its source dipole that is continually destroyed by the inane circuits that the power system scientists and engineers keep designing and building for us.

It takes as much energy input to the generator to *restore* the dipole, as it took the circuit to *destroy* the dipole. Thus all the systems our scientists and engineers design and build, require that we continually input more energy to *restore the dipole*, than the circuit *dissipates in the load*.

Our technical folks thus happily design and give us systems which can and will only exhibit COP<1.0. — thus continuing to require that we ourselves steadily provide more energy to the system to continually rebuild its dipole, than the inane masochistic system uses to power its load.

In short, we pay the power companies (and their scientists and engineers) to deliberately engage in a giant wrestling match inside their generators and *lose*.

Needless to say, that *is not* the way to run the railroad! One is reminded of one of the classic comments by Churchill:

"Most men occasionally stumble over the truth, but most pick themselves up and continue on as if nothing had happened."

Unfortunately, at present it seems that not very many energy system scientists and engineers have "stumbled over the truth" as to what really powers their systems, and how inanely they are really designing them.

Electrical Energy Required from Hydrocarbon Burning Drives the Problem

The heart of the present environmental pollution problem is the ever-increasing need for electrical energy obtained from burning of hydrocarbon fuels and/or nuclear power stations.

The increasing production of electrical power to fill the rising needs, increasingly pollutes the environment including the populace itself (lungs, bodies, etc.). Almost every species on earth is affected, and every year some species become extinct as a result.

Environmental pollution includes pollution of the soil, fresh and salt water, and the atmosphere by a variety of waste products. Given global warming, it also includes excess heat pollution in addition to chemical and nuclear residues.

Under present procedures, the electrical energy problem is exacerbated by decreasing available oil supplies, which are believed to have peaked this year, with a projected decline from now on.

But really, the electrical energy problem is due to the scientific community's adamant defense and use of electrical power system models and theories that are 136 years old {49} in their very foundations, riddled with errors and non sequiturs, and seriously flawed.

The scientific community has not even recognized the problem, much less the solution. In fact, it does not even *intend* to recognize the problem, even though the basis for it has been known in particle physics for nearly 50 years. As Bunge {50} put it some decades ago:

"...it is not usually acknowledged that electrodynamics, both classical and quantal, are in a sad state."

The scientific community has done little to correct that fundamental problem since Bunge made his wry statement.

Let us put it very simply: The most modern theory today is modern gauge field theory. In that theory, freedom of gauge is assumed from the getgo. Applied to electrodynamics, this means — as all electrodynamicists have assumed for the last century or longer — that the potential energy of an EM system can be freely changed at will. In other words, in theory it costs nothing at all to increase the EM energy collected in a system; this is merely "changing the voltage", which does not require power. In other words, we can "excite" the system with excess energy (actually taken from the vacuum), at will. For free. And the best science of the day agrees with that statement.

It also follows that we can freely change the excitation energy again, at will. In short, we can dissipate that excess energy freely and at will. Without cost.

Well, this means that we are free — by the laws of nature, physics, thermodynamics, and gauge field theory — to dissipate that free excess potential energy in an external load, thus doing "free work".

Since none of the systems our energy scientists and engineers build for us are *doing* that, it follows *a priori* that the fault lies entirely in their own system design and building. It does *not* lie in any prohibition by nature or the laws of physics.

A priori, then, the present COP<1.0 performance of our electrical power systems is a monstrosity and the direct fault of our scientists and engineers. We cannot blame the laws of nature or the laws of physics.

The present energy crisis then is due totally to that "conspiracy of ignorance" we referred to, that is maintained by the scientific community, and that has been maintained by it for more than 100 years.

This is the real situation that the environmentalists must become aware of, if they are to see the correct path into which their energies and efforts should be directed — to solve both the energy crisis and the problem of gigantic pollution of the biosphere.

Outside Intervention Must Forcibly Move Energy Science Forward

Unless outside intervention occurs forcibly, the scientific community's lock-up of research funds for "in the box" energy research may result in the economic collapse of the Western World in perhaps as little as eight years.

Let us examine the gist of the problem facing us.

Suppose we launch a crash program to develop, manufacture, deploy, and employ the new "vacuum powered" systems. Once the new self-powering systems are developed and ready to roll off the production lines en masse, it will require a minimum of five years worldwide to sufficiently alter the "electrical energy from oil" demand curve, so that economic collapse can be averted. In turn, this means that the new systems must be ready to roll off the manufacturing lines by the end of 2003. While this is a very tight schedule, it can be done if we move rapidly.

The necessary scientific corrections along the lines indicated in this paper can be quickly applied to solve the electrical energy problem permanently and economically, given a Manhattan type

project under a Presidential Decision Directive together with a Presidential declaration of a National Energy Emergency.

In a paper {51} to be published in Russia in July 2000, this researcher has proposed some 15 viable methods for developing new "self-powering" systems powering themselves and their loads with energy extracted from the vacuum. Several of these systems can be developed very rapidly and easily mass produced.

A second paper {52} will be published in the same proceedings, revealing the Bedini method for invoking a negative resistor inside a storage battery. The negative resistor freely extracts vacuum energy and adds it to both the battery-recharging function and the load powering function.

In Bedini's negative resistor method, decoupling (dephasing) the ion current inside the battery from the electron current between the outer circuit and the external surfaces of the battery plates, allows the battery to be charged (with increased charging energy) simultaneously as the load is powered with increased current and voltage.

At my specific request, both papers were thoroughly reviewed by qualified Russian scientists, and the premises passed with flying colors.

A third paper {53} gives the exact giant negentropy mechanism by which the dipole extracts such enormous energy from the vacuum. We will further explain that mechanism below.

Conventional Approaches: Too Little, Too Late

It appears that the Environmental Community itself has finally realized that the present scientific approaches and research are simply too little and too late. Further, the conventional approaches are largely "in the box thinking" applied to an "out of the box problem." We leave it to others such as Loder {54} to succinctly summarize the shortfalls of these present solutions. Loder, e.g., particularly and incisively explains how the problem with automobiles breaks down.

In fact, no one single COP>1.0 approach will be all-sufficing. Several solutions, each for a different application, must be developed and deployed simultaneously.

As an example, it is possible to create certain dipolar phenomena in plasmas produced in special burners, such that the dipoles extract substantial excess EM energy from the vacuum and output it as ordinary excess heat well beyond what the combustion process alone will yield. Given a Manhattan type project, the inventor of that process (with already working models and rigorous measurements) could rapidly be augmented to develop a series of replacement burners (heaters) for ordinary electrical power plants to use in heating the water to make the steam for the steam turbines turning the shafts of the generators. The entire remainder of the power system, grid, etc. could be left intact. Some fuel would still be burned, but far less would be consumed in order to furnish the same required heat output.

In short, a rather dramatic reduction in power plant hydrocarbon combustion could be achieved — in the present electrical power plants with minimum modification, and in the necessary time frame — while maintaining or even increasing the electrical energy output of the power systems. We believe the inventor would fully participate in a government-backed Manhattan type energy program where a National Emergency has been declared, given a U.S. government guarantee that his process, equipment, and inventions will not be confiscated. {55}

Another process capable of quick development and enormous application is the development of point contact transistors as true negative resistors {30}.

Two other processes that can be developed for massive production in less than two years are (i) the Kawai process {18}, and (ii) the magnetic Wankel process {19}. In addition, the Johnson {20} process can be developed and readied for manufacture in the same time frame, given a full-bore sophisticated laboratory team.

There are other processes {56} {51} {52}which can also be developed rapidly, to provide major contributions in solving their parts of the present "electrical energy from hydrocarbon combustion" problem.

Giant Negentropy and a Great New Symmetry Principle

We now summarize some recent technical discoveries by the present author that bear directly upon the problem of extracting and using copious EM energy flows from the vacuum.

Any dipole has a scalar potential between its ends, as is well-known. Extending earlier work by Stoney {57}, in 1903 Whittaker {58} showed that the scalar potential decomposes into — *and identically is* — a harmonic set of bidirectional longitudinal EM wavepairs. Each wavepair is comprised of a longitudinal EM wave (LEMW) and its phase conjugate LEMW replica. Hence the formation of the dipole actually initiates the ongoing production of a harmonic set of such biwaves in 4-space {59}.

We separate the Whittaker waves into two sets: (i) the convergent phase conjugate set, in the imaginary plane, and (ii) the divergent real wave set, in 3-space. In 4-space, the 4th dimension may be taken as -*ict*. The only variable in -*ict* is *t*. Hence the phase conjugate waveset in the scalar potential's decomposition is a set of harmonic EM waves converging upon the dipole in the time dimension, *as a time-reversed EM energy flow structure inside the structure of time* {60}. Or, one can just think of the waveset as converging upon the dipole in the imaginary plane {61} — a concept similar to the notion of "reactive power" in electrical engineering.

The divergent real EM waveset in the scalar potential's decomposition is then a harmonic set of EM waves radiating out from the dipole in all directions at the speed of light. As can be seen, there is perfect 4-symmetry in the resulting EM energy flow, but there is broken 3-symmetry since there is no observable 3-flow EM energy input to the dipole.

Our professors have taught us that output energy flow in 3-space from a source or transducer, must be accompanied by an input energy flow in 3-space. That is not true. It must be accompanied by an input energy flow, period. That input can be an energy flow in the 4th dimension, time — or we can consider it as an inflow in the imaginary plane. The flow of energy must be conserved, not the dimensions in which the flow exists. There is no requirement by nature that the inflow of energy be in the same dimension as the outflow of EM energy.

Indeed, nature prefers to do it the other way! Once one unties nature's foot from the usually enforced extra condition of 3-space energy flow conservation, nature joyfully and immediately sets up a giant 4-flow conservation, ongoing, where enormous EM energy is inflowing from the imaginary plane into the source charge or dipole, and is flowing out of the source charge or dipole in 3-space, at the speed of light, and in all directions.

In other words, nature then gladly gives us as much EM energy flow as we need, indefinitely — just for paying a tiny little bit initially to "make the little dipole." After that, we never have to pay anything again, and nature will happily keep on pouring out that 3-flow of EM energy for us. This is the giant negentropy mechanism I uncovered, performed in the simplest way imaginable: just make an ordinary little dipole.

We may interpret the giant negentropy mechanism in electrical engineering terms {62}. The EM energy flow in the imaginary plane is just incoming "pure reactive power" in the language of electrical engineering. The outgoing EM energy flow in the real plane (3-space) is "real power" in the same language. So the dipole is continuously receiving a steady stream of reactive power, transducing it into real power, and outputting it as a continuous outflow of real EM power.

Further, there is perfect 1:1 correlation between the convergent waveset in the imaginary plane and the divergent waveset in 3-space. This perfect correlation between the two sets of waves and their dynamics represents a *deterministic re-ordering* of a fraction of the 4-vacuum energy — a re-ordering initiated by the formation of the dipole, and spreading radially outward at the speed of light.

This clearly shows that (i) we can initiate reordering of a usable fraction of the vacuum's energy at any place, anytime, easily and cheaply (we need only to form a simple dipole), and (ii) the process continues indefinitely, so long as the dipole exists, without the operator inputting a single additional watt of power.

And the greatest benefit of all is that, so long as the dipole exists and this re-ordering continues, a copious flow of observable, usable EM energy pours from the dipole in all directions at the speed of light.

This is the full solution to the first half of the energy crisis, totally solved once and for all.

Ansatz of the Major Players

Scientific Community

For the most part, the organized scientific community varies from highly resistant to openly hostile toward any mention of extracting copious EM energy from the active vacuum. The "Big Nuclear" part of the community is particularly adamant in this respect, as witness its ferocious onslaught on the fledgling and struggling cold fusion researchers — a ferocity of scientific attack seldom seen in the annals of science {63} {64}.

The scientific community also largely suppresses {65} or severely badgers scientists attempting to advance electrodynamics to a more modern model, suitable to the needs of the 21st century and the desperate need for cheap, clean, nonpolluting electrical power worldwide {12}. The community still applies classical *equilibrium* thermodynamics to the electrical part of all its electrical power systems, even though every EM system is inherently a system *far from equilibrium* with the active vacuum environment, and a different thermodynamics applies. Only if the system is specifically so designed — e.g., so that during the dissipation of its excitation energy it enforces the Lorentz symmetrical regauging condition — will the system behave as a classical equilibrium system.

The thermodynamics of open dissipative systems is well-known {66}. Such systems are permitted to (1) self-order, (2) self-oscillate or self-rotate, (3) output more energy than the operator inputs (the excess energy is freely received from the active environment), (4) power itself and its load

simultaneously (all the energy is taken from the active environment, similar to a windmill's operation), and (5) exhibit negentropy.

That our present electrical power systems do not do these five things, even though every one of them is an open system in violent energy exchange with the vacuum, *a priori* reveals that it is the scientific model and the engineering design that are at fault.

It is not any law of nature or principle of physics that prevents self-powering open electrical power systems. Instead, it is the scientific community and its prevailing mindset against extracting and using EM energy from the vacuum.

Environmental Community.

In the past the environmental community has been overly naïve with respect to physics, and particularly with respect to electrical physics. Its science advisors have come mostly from the conservative "in the box" scientific community. Hence the community has failed to realize that COP>1.0 electrical power systems are normal and permitted by the laws of nature and the laws of physics. They have no inkling that Heaviside discovered — *in the 1880s!* —the enormous unaccounted EM energy pouring from the terminals of any battery or generator. They are unaware that Poynting considered only the tiny component of the energy flow that enters the circuit. They are also unaware that, completely unable to explain the astounding enormity of the EM energy flow if the nondiverged (nonintercepted) Heaviside component is accounted, Lorentz {9} just arbitrarily used a little procedure to *discard* that troublesome Heaviside "dark" (unaccounted) component.

Lorentz reasoned that, since the huge dark energy flow component missed the circuit entirely, it "had no physical significance." This is like arguing that none of the wind on the ocean has any physical significance, except for that small portion of the wind that strikes the sail of one's own sailboat. It ignores the obvious fact that whole fleets of additional sailboats can also be powered by that "physically insignificant" wind component that *misses* one's own sailboat entirely.

Nonetheless, electrodynamicists continue to use Lorentz's little discard trick, and try to call the feeble Poynting energy flow component caught by the circuit the *entire* EM energy flow connected with it. This is like arguing that the component of wind hitting the sails of one's own sailboat, is the entire great wind on the ocean.

As a result, the environmental community has failed to grasp the real reason for the energy crisis and the increasing pollution of the biosphere. They have been deceived and manipulated into thinking that conventional organized science is giving them the very best technical advice possible on electrical power systems. The environmentalists have been and are further deceived into believing that the conventional scientific community is advocating and performing the best possible scientific studies and developments for trying to solve the energy crisis.

Of major importance, the environmental community itself has been deceived as to the exact nature of the energy flow in and around a circuit, the vastness of the unaccounted energy flow (or even that any of the energy flow is deliberately unaccounted), and the fact that this present but unaccounted EM energy flow can be intercepted and captured for use in powering loads and developing self-powering systems.

Worst of all, the environmental community has been deceived as to what powers every electrical load and EM circuit, and that burning all those hydrocarbons, using those nuclear fuel rods,

building those dams and windmills, and putting out solar cell arrays are necessary and the best that can be done. In short, they have been smoothly diverted from solving the very problem — the problem of the increasing pollution and destruction of the biosphere — they are striving to rectify.

However, judging from their continued demonstrations in the street, at least many environmentalists now suspect that much of the world's continued policy of "the rich get richer and the poor get poorer" in international trade agreements are deliberately planned and implemented to the advantage of a favored financial class and the exploitation of the poorer laboring classes in disadvantaged nations.

Electrical Power Community.

The electrical power community:

(1) ubiquitously uses equilibrium thermodynamics, believing that COP>1.0 is perpetual motion nonsense and against the laws of physics,

(2) has no notion that the energy flowing down their power lines and filling all space around them, is extracted directly from the active vacuum by the source dipole in the generator,

(3) erroneously believes that the hydrocarbons they burn, or the water through the hydroturbines at the dam, or the nuclear fuel rods they consume, actually add the power to the transmission lines,

(4) uses half of the tiny component of energy caught by the power lines, to destroy the source dipoles in their generators, thus requiring ever more shaft input energy via powering a steam turbine, hydroturbine, etc.,

(5) believes that energy can be "used" only once, when in fact it can be used and re-used repeatedly since it cannot be created or destroyed,

(6) allows only a single pass of the EM energy flow down the power lines, so that only one tiny interception of energy occurs from the energy flow and the rest (most) of the energy flow is wasted,

(7) believes that the electrical energy problem translates into more hydrocarbon combustion or nuclear fuel rod consumption rather than a totally different way of doing business, and

(8) believes that the theory they apply is correct, when in fact it is so seriously flawed as to be inane, *and has been inane for a century*.

Industries also acquire their own hidden agendas, when serious threats to the industry arises. As an example, a potentially serious problem arose some decades ago when it became apparent that EM radiation from power lines might detrimentally affect people or at least some people. To put it gently, a great deal of fuss and fury resulted, and a great deal of money was and is spent by the power companies (or through organizations and foundations funded by them) in EM bioeffects research. Not too surprisingly, just about the entire output of this industry-funded research "finds" that there is no problem with powerline radiation {67}. Those scientists such as Robert Becker {68} {69} who advocate or show otherwise, usually wind up having all their funds cut off, hounded from their jobs, and — in the case of Becker — forced to retire early.

It is no different in the electrical energy science field {12}.

Storage Battery Companies.

Battery companies are primarily of much the same outlook and ansatz as are the power companies. They have gone to pulse charging of batteries and improved battery chemistry and materials {70}. They have no notion that batteries do not power circuits, but only make source dipoles — and it is the source dipole that then extracts EM energy from the vacuum and pours it out into the external circuit.

Consequently they erroneously believe that chemical energy in the battery is expended *in order to provide power to the external circuit*. Instead, it is expended only to continuously remake the source dipole, which the closed current loop circuit fiendishly keeps destroying faster than the load is powered.

They also have not investigated deliberately dephasing and decoupling the major ion current within the battery and between the plates, from the electron current between the outside of the plates and the external circuit. Consequently they have no concept of permissible Maxwellian COP>1.0 battery-powered systems. Instead, battery companies, scientists, and engineers still believe — along with the power companies and most electrodynamicists, and the environmental community — that applying the Lorentz symmetrical regauging to the Heaviside-Maxwell equations retains all the Maxwellian systems. *It does not*. Instead, it arbitrarily discards all Maxwellian systems which are permitted by the laws of nature and the laws of physics to produce COP>1.0!

University Community.

The University community mostly supports the prevailing EM view and also suffers from the rise of common "greed" in the universities themselves. The professor now must attract external funding (for his research, and for his graduate students —and especially for the lucrative "overhead" part of the funding which goes to the University itself). The research funds available for "bidding" via submitting proposals, are already cut into "packages" where the type of research to be accomplished in each package is rigorously specified and controlled. Research on COP>1.0 systems is strictly excluded. Dramatic revision of electrodynamics is excluded.

Unless the professor successfully bids and obtains packages and their accompanying funding, he is essentially ostracized and soon discharged or just "parked" by the wayside. Also, if he tries to "go out of the box" in his papers submitted for publication, his peer reviewers will annihilate him and his papers will not be published. Shortly he will effectively be blacklisted and it will be very difficult for him to have his submitted papers honestly reviewed, much less published. Again, that means no tenure, no security, and eventual release or "dead-end parking" by the university.

When one looks at the "innovative" packages so highly touted, they either (1) are research focused upon some approved thing such as hot fusion — which has spent billions and has yet to produce a single watt on the power line, and cannot do so in any reasonable time before the collapse of the Western economy — or (2) use clever buzzwords for things which are actually "more of the same" and "in the box thinking" with just some new words or twists thrown in for spin control.

Meanwhile, all this makes for a self-policing system which rewards conservatism — conservative publications, conservative research, conservative thinking, conservative teaching, etc. In short, it selects and approves electrical power system research that is "too little, too late" to solve the world energy crisis in time, and ruthlessly rejects all the rest. It also makes for a self-policing system which roots out and destroys (or parks on the sidelines) those professors, graduate students, and post-

docs who — given a chance to be highly innovative and "out of the box" researchers — might upset the status quo.

In short, the scientific community is itself the greatest arch foe of high innovation, and the university generally typifies and reflects that overall attitude because of the control and management of its outside research funds by the upper echelons of the organized Big Science community, government, etc.

Government Community — Technical.

The technical part of the U.S. government research community is drawn from the universities, private industry, etc. and mostly reflects an even more conservative group than the universities. Again, papers published and funding are the major requirements, within given and largely accepted scientific constraints. Further, the managerial government scientists must compete for funding, annual budgets, etc. and have their own "channel" constraints from on high. At the top levels (such as NSF and NAC), cross fertilization by the aims and perceptions of the conservative scientific community leaders is achieved.

Hence the government technical community is largely constrained in two fashions: (1) by its own forced competition for funds, facilities, positions, programs, etc., and (2) by its strong cross-fertilization from the top scientific personnel in NSF, NAC, etc. Individual scientists also face the need to publish or perish, and so are further constrained by the reviewers etc. of the journals.

Most managers within the government scientific community are striving to scamper up the managerial ladder, much as managers elsewhere. One's power and prestige rises as one's position level rises — and particularly as the part of the government's research budget rises that one controls. There is a fine tight rope to walk whereby, as one gains control of more government budget for research, one becomes a powerful influence on the large research corporations which will submit very complex and extensive proposals for the funds.

A sort of "common understanding" thus arises between industry leaders, higher government research leaders and managers, etc. This can be so profound that the practical result is almost a sort of "collusion by common understanding" between the government and industrial complexes and a fusion into one consortium — essentially the "military-industrial complex" which President Eisenhower warned Americans against.

The end result is that the government managers in their Request for Quotations (RFQs) use words such as "out of the box" and "highly innovative", but rarely will fund such proposals because they simply cannot obtain approval for such budgets and programs from "higher up the chain". As witnessed by the ultrawideband (UWB) radar controversy, the *government* technical community is even more resistant to innovation and change than is the *civilian* technical community.

As an example, the early UWB radar pioneers (Harmuth, Barrett, etc.) in ultrawideband radar were attacked by entrenched government scientists and government scientific organizations with a viciousness rarely seen in the annals of government science. The objection raised was that sinusoidal EM waves could not do such things — even though the UWB radar used nonsinusoidal EM waves, and small UWB radar sets were commercially available and used to detect voids in concrete structures, the ground, etc. The *real* reason for the violent attacks was the prestige and power of the Stealth community at the time — and because UWB radar had the implication of tracking Stealth vehicles readily.

Interestingly, the arch foes of UWB *at the time*, today would have us believe they are "staunch experts" in the UWB field. To understand their remarkable metamorphosis, one need only recall Arthur C. Clarke's words, quoted earlier.

In the COP>1.0 EM energy field, we are still rather much at the stage where the UWB researchers started. We are still in the "violent attack, personal insults, character assassination, slander, libel, etc." stage. Sadly, such ad hominem savagery is by scientists who themselves have no notion of how electromagnetic circuits are actually powered, but like ostriches still have their heads buried in the sand back there in the 1880s when Lorentz discarded the enormous Heaviside energy flow component.

Government Community — Non Technical.

Here we have a rather mixed situation. The nontechnical person — e.g., a Senator or a Congressperson — is operating under a distinct disadvantage. If he or she takes the stance that much better electrical power systems can readily be achieved, he or she is in fact opposing almost the entire set of University, Government Technical, Power Company, Battery Company, and Organized Science communities. Further, in most cases his technical advisors are themselves from one or the other of those communities, and likely to go back into that community or those communities when the Senator or Congressperson leaves office, or even before. So the Congress and the non-technical government community at large operate at a great disadvantage.

As an example, admittedly there *are* some very misguided unorthodox energy system inventors and scientists out there, who in the guise of furthering COP>1.0 systems, actually contribute to the problem rather than to the solution. A few do not even realize that they cannot properly measure a "spiky" output with an RMS meter! Some are also more interested in selling "dealerships" and "stock" than in furthering the science of COP>1.0 systems. Few have submitted their purported COP>1 devices to rigorous testing by an independent, Government-certified test laboratory {71}.

This "noise" seriously dilutes the unconventional scientific community's legitimate efforts in COP>1.0 systems. By highly playing up such "dilution" and accenting "the crazies", the orthodox scientific community often convinces government nontechnical managers and personnel that the entire unorthodox scientific COP>1.0 community is comprised only of lunatics, charlatans, stock-scam artists and misguided crank inventors.

Such of course is not the case. A goodly number of reputable, skilled scientists are seriously struggling with the problems of developing COP>1.0 EM power systems and devices. A few are also struggling to develop an adequate theory of such systems. Progress is slowly being made and has been made, in spite of continuing harassment.

The independent assessments that Congress once enjoyed with the OTA are no more because the OTA was abolished. Now the committees, subcommittees, and individual Congresspersons and Senators are largely on their own, with their own staffs and their own technical advisors.

That said, nonetheless it can be seen by savvy Senators and Congresspersons that the U.S. Ship of State is headed for a great economic bust, and probably the greatest one of all time.

The Government *Non-Technical* community (the Senate and the Congress, in particular) are in far better shape than the Government *Technical* community, to appreciate the world implications of the pending economic disaster. I am hopeful that both the environmentalists and the Government Non-Technical community will rapidly unite in a common goal to get this vacuum energy program

launched, under a National Emergency declaration. If so, then they can solve the energy crisis and the pending economic crisis, in fairly short order, and permanently.

In Conclusion

There is an even more ominous specter looming behind the shadow of the coming great economic collapse. When national economies get strained to the breaking point — with some of them failing, etc. worldwide as the price of oil escalates — the conflicts among nations will increase in number and grow in intensity. About a year or so ahead of the "Great Collapse" of the world economies, the intensity and desperation of the resulting national conflicts will have increased to the breaking point.

Some 25 nations already have weapons of mass destruction (WMD) — including nuclear warheads; missile, aircraft, boat, and terrorist delivery systems; biological warfare weaponry; other advanced weapons {3} {4}, etc.

Any knowledgeable person knows that hostile terrorist agents are already on site here in the U.S. {72}, and some will have smuggled in their WMDs. It is not too difficult to surmise that some of those missing Russian "suitcase nukes" probably wound up *right here in the U.S., hidden in our population centers*. Or that some of Saddam Hussein's large stock of anthrax has been spirited into the U.S. as well. As is well-known, the threat from weapons of mass destruction is now officially recognized as the greatest strategic threat facing the U.S. It is not a matter of *if* the WMD weapons will be unleashed, but *when*.

If one transposes that recognized escalating WMD threat onto the escalating economic pressures worldwide, then another factor comes into play — the dark side of the Mutual Assured Destruction (MAD) concept. We have opted (at least to date) not to defend our populace, but deliberately have placed U.S. population centers in a situation where their destruction is "assured" once the WMD balloon really goes up.

The insanity of the MAD concept is revealed when war preparations by many nations start to be perceived — as they will be, when the conflicts intensify sufficiently and the looming economic collapse tightens the cinch on the nations of the world.

Without any protection of its populace, a defending nation has to fire on perception of nuclear preparations by its adversaries, if that nation is to have even the slightest chance of surviving.

In short, at about that 2007 date when a nation sees its adversaries preparing WMD and nuclear assets for launch or use in ongoing intense conflicts, at some point that nation must pre-empt and fire massively, or accept its own "assured destruction".

The only question in MAD is whether or not the assured destruction shall be mutual or solitary.

So one or more nations will fire, immediately moving all the rest into the "fire on perception" mode. Very rapidly the situation then escalates to the all-out world-wide exchange so long dreaded. This massive exchange means the destruction of civilization itself, and probably much of the entire biosphere for decades or centuries. Such escalation from one or more initial nuclear firings has been shown for decades by all the old strategic nuclear studies. It is common knowledge to strategic analysts unless one engages in wishful thinking.

Eerily, this very threat now looms in our not too distant future, due in large part to the increasing and unbearable stresses that escalating oil prices will elicit.

So about seven years or so from now, we will enter the period of the threat of the Final Armageddon, unless we do something very, very quickly *now*, to totally and permanently solve the present "electrical energy from oil" crisis.

This is really why we must have a National Emergency proclamation, and a Manhattan Project, since mass manufacturing, deployment, and employment of replacement electrical power systems must begin in early 2004.

In my estimate, the point of no return for developing the self-powering replacement systems is about the end of 2003. If by early 2004 we do not have multiple types of vacuum-energy powered systems rolling off the assembly lines en masse, then we shall overshoot the point of no return and it matters not whether the systems then become available or not. They will then be too late to prevent the great Armageddon and the destruction of civilization itself.

Personally, the present author regards the increasing energy crisis as the greatest strategic threat to the United States in its entire history. I will do anything within my power to help prevent what I perceive to be the looming economic collapse of the Western world, preceded or accompanied by a sudden, explosive, all-out and continuing exchange of the WMD arsenals of most of the world.

We can still meet this early 2004 production deadline. It is difficult, but it is definitely a doable at this time.

We must do it, and we must do it now. Else the technology for electrical energy from the vacuum will also be "too little, too late." In that case, not only the world economy but civilization itself will likely be destroyed — not 100 years from now, not 50 years from now, but in less than one decade from now.

In the name of all humanity, let us begin! Else by the time this first decade of the new millennium ends, much of humanity may not remain to see the second decade.

References and Notes

1. As an example of another important but little-known factor, the Japanese Yakuza have penetrated most large Japanese corporations, including Japanese banking and *to include* the national Japanese bank. E.g., see Michael Hirsh and Hideko Takayama, "Big Bang or Bust?" Newsweek, Sept. 1, 1997, p. 44-45. Some $300 billion or more were extracted by the Yakuza from the Japanese taxpayers in a great land scandal. Japan's banks loaned billions to Yakuza-affiliated real-estate speculators, and the Yakuza would not repay the funds. As a result, the banks were literally terrified to collect on the $300-600 billion in bad debt that ensnared the banking system. E.g., when Sumitomo Bank got a little aggressive in collecting loans in Nagoya, its branch manager was killed. For a summary of this scandal, see Brian Bremner, "How the Mob burned the Banks: The Yakuza is at the center of the $350 billion bad-loan scandal," Business Week, Jan. 29, 1996, p. 42-43, 46-47. The Japanese government — i.e., the taxpayers — had to absorb this enormous loss.

The Yakuza have achieved the power and status of a hostile nation, operating within U.S.-Japanese corporate relations and other nations' relations with Japan, and also within the oriental communities of foreign states. Great influence upon the ability or inability of the U.S. government to continue its deficit financing now rests in the hands of the Yakuza. Effectively, the Yakuza can trigger a U.S. stock market crash at will, by simply shutting off all further Japanese purchase of U.S. government deficit financing bonds.

The Yakuza regard themselves as the last Samurai, still follow the old Bushido concept, and are intensely hostile to the United States for the humiliating defeat of Japan in WW II and for dropping the atomic bomb on Japan. At the critical time in the coming economic crisis, cessation of Japanese purchase of U.S. Government bonds can and will initiate the financial *coup de grace* which generates the final and sudden

collapse of the U.S. economy, dragging down other economies with it. It appears that the Yakuza tested the response of the U.S. stock market to this tactic on two occasions, by simply slowing the rate of Japanese purchases of U.S. government bonds. The immediate drops in the stock market on both occasions showed the efficacy of this financial weapon, whenever the Yakuza wish to employ it.

In the U.S., the Yakuza constitute an important and growing hostile terrorist group, an intense subculture increasing in numbers, and a group biding its time prior to engaging in mass terrorism strikes. In 1990 the Yakuza together with the Aum Shinrikyo leased the operational use of clandestine strategic longitudinal EM wave interferometer weapons in Russia, and now possess some of the most powerful strategic weapons on earth (see notes 3 and 4, below).

2. The recent historic meetings of North and South Korean leaders, with proclamations of cooperation etc., are a healthy sign for the better. With the former implacable North Korean dictator now dead, the new and younger leader may have less hostile outlook. However, progress can be made only very slowly, since the Communist apparatus is still in power in the armed forces and the nation. Only as more of the old die-hard Communist leaders die off, will real progress start to be made in materially lessening the threat posed by North Korea. That is a process requiring a generation, but at least a start has been made. For our thesis, that progress is likely to be sufficiently slow that, while it damps the stress curves a little, it has no appreciable effect on the overall thesis of the eruption within the decade of a great conflagration involving weapons of mass destruction.

3. Also involved, there are clandestine weapons of far greater power than nuclear weapons, but most of that subject is beyond the scope of this presentation. For some time we have informed the U.S. government of these developments, the evidence, the events, etc. An example — current at its time of preparation — is T. E. Bearden, Energetics: Extensions to Physics and Advanced Technology for Medical and Military Applications, CTEC Proprietary, May 1, 1998, 200+ page inclosure to CTEC Letter, “Saving the Lives of mass BW Casualties from Terrorist BW Strikes on U.S. Population Centers,” to Major General Thomas H. Neary, Director of Nuclear and Counterproliferation, Office of the Deputy Chief of Staff, Air and Space Operations, HQ USAF, May. 4, 1998. Copies of a similar presentation were furnished the DoD, Senator Shelby as head of the Senate's Intelligence subcommittee, and Congressman Weldon as head of the House's Intelligence subcommittee efforts, as well as other U.S. government agencies.

4. The earlier clandestine asymmetrical strategic weapons developed by the former USSR under rigid KGB control, were longitudinal EM wave interferometers, which are the weapons obliquely referred to by Defense Secretary Cohen in this statement: "*"Others [terrorists] are engaging even in an eco-type of terrorism whereby they can alter the climate, set off earthquakes, volcanoes remotely through the use of electromagnetic waves… So there are plenty of ingenious minds out there that are at work finding ways in which they can wreak terror upon other nations…It's real, and that's the reason why we have to intensify our [counterterrorism] efforts."* Secretary of Defense William Cohen at an April 1997 counterterrorism conference sponsored by former Senator Sam Nunn. Quoted from DoD News Briefing, Secretary of Defense William S. Cohen, Q&A at the *Conference on Terrorism, Weapons of Mass Destruction, and U.S. Strategy*, University of Georgia, Athens, Apr. 28, 1997. The present author has been briefing these weapons to DoD and other government agencies for many years. Most major weapons laboratories in various nations have now discovered longitudinal EM waves and either have such weapons or are furiously developing them. At least seven nations now possess them.

5. Proceeding conventionally as at present, it will be 50 years before the organized scientific community will permit these emerging solutions to actually be developed and produced. This is senseless; as the Manhattan Project in WW II showed, a newly emerging technology can go to production in four years. Given only that neutron fission of the proper uranium isotope produced more neutrons than were input, the Manhattan Project developed fully operational atomic bombs of two major types in four years. An appreciable number of other "waiting areas for such development" exist in science in the literature, but are not usually pushed forward into development for decades due to the continuing resistance of the scientific community to all innovations which threaten the favored projects (such as hot fusion) and favored theories. Any "scientist in the trenches" is well-

aware that the progress of science is by means of a continuing massive cat and dog fight, not at all by sweet scientific reason and logic.

6. We strongly point out that Maxwell's equations are purely hydrodynamic equations. There is thus a 100% correspondence to hydrodynamics and electromagnetic power systems. Anything that can be done mechanically, or hydrodynamically with fluid flow, can be done with electromagnetic field energy flow, *a priori*. It is thus a serious fault of the scientific community in proclaiming that electrical power systems with COP>1.0 are prohibited, because closed systems cannot exhibit COP>1.0. All such arguments are evanescent, since all they state is that an open EM system far from thermodynamic equilibrium with the active vacuum is what is required. But the classical electrodynamics (136 years old) used to design and build electrical power systems, does not even model the energy exchange between active vacuum and the system. To put it mildly, this is a completely inexplicable aberration of the scientific mindset, and it has been such for over a century.

7. Open EM systems far from thermodynamic equilibrium with their electrically active vacuum environment are indeed permitted by the Maxwell-Heaviside equations, prior to the arbitrary symmetrical regauging of the equations to yield simpler equations more mathematically amenable (done by Lorenz in 1867 and later by H.A. Lorentz). The Lorentz condition requires that the system be symmetrical in its discharge of its free excitation energy. The present closed current loop circuit ubiquitously used in power systems is designed specifically such that the system itself enforces the Lorentz symmetrical discharge of its excitation energy. Thus one-half of the energy is discharged in the external losses and load, while one-half is discharged to destroy the source dipole actually extracting the EM energy from the active vacuum. Such design guarantees a system which destroys its intake of free electrical energy from the vacuum faster than it can use part of that energy to power the load. I.e., it guarantees suicidal systems which can only exhibit COP<1.0. Every electrical system ever built has been and is powered by electrical energy extracted directly from the seething vacuum, as we explain in the present paper.

8. Such open systems far from thermodynamic equilibrium in the active vacuum exchange, rigorously are permitted to exhibit COP>1.0 and power themselves and their loads simultaneously. By building only that subset of Maxwellian systems that forces Lorentz symmetrical regauging during discharge of the system's excitation energy, our scientists and engineers have in fact simply discarded all those Maxwellian systems not in equilibrium with the vacuum during their excitation discharge. In short, they simply do not build any such systems, or even design such. The scientific and engineering communities themselves have directly produced and maintained the present horrible energy crisis and pollution of the biosphere.

9. We can now show that enormous EM energy flow can be easily and cheaply initiated from the active vacuum, anywhere, at any time. The basis for this was in fact discovered by Heaviside in the 1880s. Lorentz knew of this huge energy flow component but discarded it arbitrarily, apparently to avoid being attacked and accused of being a perpetual motion advocate. See H.A. Lorentz, Vorlesungen über Theoretische Physik an der Universität Leiden, Vol. V, Die Maxwellsche Theorie (1900-1902), Akademische Verlagsgesellschaft M.B.H., Leipzig, 1931, "Die Energie im elektromagnetischen Feld," p. 179-186. Figure 25 on p. 185 shows the Lorentz concept of integrating the Poynting vector around a closed cylindrical surface surrounding a volumetric element. This is the procedure which arbitrarily selects only a small component of the energy flow associated with a circuit — specifically, the small Poynting component striking the surface charges and being diverged into the circuit to power it — and then treats that tiny component as the "entire" Poynting energy flow.

10. The mathematical "trick" used by Lorentz to get rid of this easily and universally evoked giant negentropy, is still employed by electrical scientists and engineers without realizing what is actually being discarded. For a full explanation, see T.E. Bearden, "Giant Negentropy from the Common Dipole," Proc. IC-2000, St. Petersburg, Russia, July 2000 (in press). A series of excellent papers by the Alpha Foundation's Institute for Advanced Study (AIAS) have also been published, approved for publication, or submitted for consideration, in leading journals. An example is M.W. Evans, T.E. Bearden et al., "Classical Electrodynamics without the Lorentz Condition: Extracting Energy from the Vacuum," Physica Scripta, Vol. 61, 2000, p. 513-

517. A most formidable new AIAS paper, "Electromagnetic Energy from Curved Spacetime," has been submitted to Optik and is in the referee process. Two related paper giving a very solid basis for vacuum energy are M.W. Evans *et al*., "The Most General Form of Electrodynamics," and "Energy Inherent in the Pure Gauge Vacuum," both submitted to Physica Scripta and in the referee process. The theoretical basis for extracting copious EM energy from the vacuum is now unequivocal and either has been published or is rapidly being published in leading journals.

11. For example, see Myron W. Evans *et al*., AIAS group paper by 15 authors, "Classical Electrodynamics Without the Lorentz Condition: Extracting Energy from the Vacuum," *ibid.*; "Runaway Solutions of the Lehnert Equations: The Possibility of Extracting Energy from the Vacuum," Optik, 2000 (in press); — "Vacuum Energy Flow and Poynting Theorem from Topology and Gauge Theory," submitted to Physica Scripta; — "Energy Inherent in the Pure Gauge Vacuum," submitted to Physica Scripta; — "The Most General Form of Electrodynamics," submitted to Physica Scripta; "The Aharonov-Bohm Effect as the Basis of Electromagnetic Energy Inherent in the Vacuum," submitted to Optik; — "Electromagnetic Energy from Curved Spacetime," submitted to Optik.

12. As an example: The most critical scientist in the Western world who is working on the "energy from the vacuum" approach, is Dr. Myron Evans, Founder and Director of the Alpha Foundation's Institute for Advanced Study (AIAS). Dr. Evans was hounded from his professorial position, has had his life threatened, has been without salary for several years, and fled to the United States for his very life. He has some 600 papers in the hard literature, and is presently producing — in accord with Dr. Mendel Sachs' epochal union of general relativity and electrodynamics — the world's first engineerable unified field theory, and an advanced electrodynamics fully capable of dealing with and modeling EM energy from the vacuum. Yet Dr. Evans lives in the United States (where he recently became a naturalized citizen) at the poverty level, can afford only one meal a day, has no automobile, no air condition, and continues epochal work under a medical condition that would stop any ordinary person less scientifically dedicated. He continues to be vilified and viciously attacked by elements of the scientific community, even though other elements are of much assistance in publishing and reviewing his papers, etc. It is a remarkable commentary upon the sad state of our organized scientific community that such a scientist and such epochal work, of such tremendous importance to both the United States and all humanity, must continue in such circumstances while community spends billions on vast projects of little significance in general, and of no significance at all in avoiding the coming world Economic collapse and the destruction of civilization. If this paper should fall into sympathetic hands which can obtain funding for Dr. Evans, then this author most fervently urges that such be accomplished at all speed. The fate of most of the civilized world may well hinge upon such a simple thing, and upon such an insignificant expenditure.

13. These are listed in M.W. Evans et al., "Classical Electrodynamics Without the Lorentz Condition: Extracting Energy from the Vacuum," *ibid*.

14. This system exists in small working prototype already, but I am under a nondisclosure agreement and cannot reveal the details of the process or the identity and location of the inventor. The system is capable of being rapidly scaled up to meet the 2003 critical milestone of "ready for mass production". One can expect up to a COP = 4 from this process.

15. In an electrical power system, Coefficient of Performance (COP) may be taken as the average energy dissipated in the load divided by the average energy furnished to the system by the operator. Or, it may be taken as the average power dissipated in the load divided by the average power dissipated in the input process. COP can be taken across any component, several components, or the entire system. The COP of a normal generator itself may be 0.9, for example, while when the entire system including the heater, etc. is taken into account, the system COP may be only 0.3. For COP>1.0, excess energy must be furnished to the system by the external environment, while only part of the energy (or none of it) input is furnished by the operator.

16. The Kawai process, Johnson process, and the magnetic Wankel engine are ideal for this purpose.

17. T.E. Bearden, "Bedini's Method For Forming Negative Resistors In Batteries," Proceedings of the IC-2000, St. Petersburg, Russia, July 2000 (in press).

18. Teruo Kawai, "Motive Power Generating Device," U.S. Patent No. 5,436,518. Jul. 25, 1995. Applying the Kawai process to a magnetic motor essentially doubles the motor's efficiency. If one starts with high efficiency magnetic motors of, say, COP = 0.7 or 0.8, then the new COPs will be 1.4 and 1.6. Two Kawai-modified high efficiency Hitachi motors were in fact independently tested by Hitachi and yielded COP 1.4 and 1.6 respectively.

19. See T.E. Bearden, “The Master Principle of EM Overunity and the Japanese Overunity Engines,” Infinite Energy, 1(5&6), Nov. 1995-Feb. 1996, p. 38-55; “The Master Principle of Overunity and the Japanese Overunity Engines: A New Pearl Harbor?”, The Virtual Times, Internet Node www.hsv.com, Jan. 1996. The principle of the magnetic Wankel engine is self-evident from the drawings alone.

20. Johnson, Howard R., "Permanent Magnet Motor." U.S. Patent No. 4,151,431, Apr. 24, 1979; "Magnetic Force Generating Method and Apparatus," U.S. Patent No. 4,877,983, Oct. 31, 1989; "Magnetic Propulsion System," U.S. Patent No. 5,402,021, Mar. 28, 1995.

21. In magnetic materials, the presence of two electrons near each other and having parallel spins results in the presence of a very strong force tending to flip the spin so that they are antiparallel. The forces between the electrons due to spin geometry are exchange forces of quantum mechanical nature. In complex assemblies of different magnetic materials comprising a single stator or rotor magnet, the shapes and structures can be produced so that, as the rotor moves by the attracting stator and enters the usual back mmf zone, the powerful spin force is suddenly unleashed by the geometry, relative field strengths, and movement. This triggers the release of a violent pulse of magnetic field which greatly overrides the back mmf and strongly repels the rotor on out of this "gate" region where the exchange force is triggered. Exchange force pulses may momentarily be 1,000 times as strong as the magnetic field **H**, or in some cases even stronger. Evoking these responses automatically by the materials themselves, at controlled times and directions, produces the open system freely adding rotary energy from its vacuum exchanges inside the nonlinear materials. Johnson has been able to achieve this effect consistently, opening the way for a legitimate self-powering permanent magnet motor. We accent that the electrons involved are in direct energy exchange with the vacuum, and the exchange force energy comes from the violently broken symmetry in that vacuum exchange. Multivalued magnetic potentials and hence nonconservative magnetic fields arise naturally in magnetic theory anyway, but conventional scientists exert enormous effort to eliminate such effects or minimize them — when in fact what is needed is to deliberately evoke and use them to produce systems with COP>1.0.

22. Surrounding every dipolar EM circuit there exists a vast flow of nondiverged EM energy which misses the circuit entirely and is not presently accounted (thus "dark") in electrical power systems and circuit theory. Heaviside discovered it, Poynting never realized it, and Lorentz discarded it because (a) he reasoned it was physically insignificant because it did nothing in the circuit, and (b) no one had the foggiest notion where such an enormous flow of EM energy — pouring from the terminals of every battery and generator — could possibly be coming from. The trick Lorentz used to arbitrarily discard it is still used by electrodynamicists ubiquitously. For a full background, see T.E. Bearden, "Giant Negentropy from the Common Dipole," 2000 (*ibid.*); "On Extracting Electromagnetic Energy from the Vacuum, " Proceedings of the IC-2000, St. Petersburg, Russia, July 2000 (in press); "Dark Matter or Dark Energy?", Journal of New Energy, 2000 (in press).

23. Energy cannot be created or destroyed, but only changed in form. Changing the form of energy is called "work". When one joule of collected energy is "dissipated" to perform one joule of work, one still has one joule of energy remaining after that joule of work. The energy is now just in a different form. Scattering of energy in a resistor, e.g., is perhaps the simplest way of performing work, and known as "joule heating". However, for a thought experiment: If the resistor is surrounded by a phase conjugate reflective mirror surface, much of the scattered energy will be precisely returned back to the resistor as re-ordered energy, and can indeed be "used" again by scattering in the resistor to do work. There is no conservation of work law in physics or

thermodynamics! If there is no re-ordering at all, then one can get only one joule of work from one joule of energy changed in form. The remaining joule of energy in different form (as in heat) is just "wasted" from the system. But if we deliberately use re-ordering (such as simple passive retroreflection), one can use the same joule of energy to do joule after joule of work, changing the form of the energy in each interaction. Eerily, most of our scientists and engineers are aware that energy can be changed in form indefinitely without loss, but will then argue that energy cannot be recycled and reused. Such is the depth of the scientific prejudice against "COP>1.0" processes and systems that many scientists are rather totally incapable of dealing with the real law of conservation of energy — which is simply that you can never get rid of any energy, at all, but can only change its form. Every joule of energy in the universe, e.g., was present not long after the Big Bang. Since then, most of those joules of energy have each been doing joule after joule of work, for some 15 billion years.

24. Kenneth R. Shoulders, "Energy Conversion Using High Charge Density," U.S. Patent # 5,018,180, May 21, 1991. See also Shoulders' patents 5,054,046 (1991); 5,054,047 (1991); 5,123,039 (1992), and 5,148,461 (1992). See also Ken Shoulders and Steve Shoulders, "Observations on the Role of Charge Clusters in Nuclear Cluster Reactions," Journal of New Energy, 1(3), Fall 1996, p. 111-121.

25. For a summary of this rapidly developing field, see Diederik Wiersma and Ad Lagendijk, "Laser Action in Very White Paint," Physics World, Jan. 1997, p. 33-37.

26. For the early discovery, see V.S. Letokhov, “Generation of light by a scattering medium with negative resonance absorption,” Zh. Eksp. Teor. Fiz., Vol. 53, 1967, p. 1442; Soviet Physics JETP, Vol. 26, 1968, p. 835-839; “Laser Maxwell’s Demon,” Contemporary Physics, 36(4), 1995, p. 235-243. For initiating experiments although with external excitation of the medium, see N.M. Lawandy *et al*., "Laser action in strongly scattering media," Nature, 368(6470), Mar. 31, 1994, p. 436-438. See also D.S. Wiersma, M.P. van Albada, and A. Lagendijk, Nature, Vol. 373, 1995, p. 103.

27. For new effects, see D.S. Wiersma and Ad. Lagendijk, "Light diffusion with gain and random lasers," Physical Review E, 54(4), 1996, p. 4256-4265; D.S. Wiersma, Meint. P. van Albada, Bart A. van Tiggelen, and Ad Lagendijk, "Experimental Evidence for Recurring Multiple Scattering Events of Light in Disordered Media," Physical Review Letters, 74(21), 1995, p. 4193-4196; D.S. Wiersma, M.P. Van Albada, and A. Lagendijk, Physical Review Letters, Vol. 75, 1995, p. 1739; D.S. Wiersma *et al*., Nature, Vol. 390, 1997, p. 671-673; F. Sheffold *et. al.*, Nature, Vol. 398, 1999, p. 206; J. Gomez Rivas *et al*., Europhysics Letters, 48(1), 1999, p. 22-28; Gijs van Soest, Makoto Tomita, and Ad Lagendijk, "Amplifying volume in scattering media," Optics Letters, 24(5), 1999, p. 306-308; A. Kirchner, K. Busch and C. M. Soukoulis, Physical Review B, Vol. 57, 1998, p. 277.

28. A true negative resistor appears to have been developed by the renowned Gabriel Kron, who was never permitted to reveal its construction or specifically reveal its development. For an oblique statement of his negative resistor success, see Gabriel Kron, "Numerical solution of ordinary and partial differential equations by means of equivalent circuits," J. Appl. Phys., Vol. 16, Mar. 1945a, p. 173. Quoting: "*When only positive and negative real numbers exist, it is customary to replace a positive resistance by an inductance and a negative resistance by a capacitor (since none or only a few negative resistances exist on practical network analyzers)."* Apparently Kron was required to insert the words "none or" in that statement. See also Gabriel Kron, “Electric circuit models of the Schrödinger equation,” Phys. Rev. 67(1-2), Jan. 1 and 15, 1945, p. 39. We quote: "*Although negative resistances are available for use with a network analyzer,…".* Here the introductory clause states in rather certain terms that negative resistors were available for use on the network analyzer, and Kron slipped this one through the censors. It may be of interest that Kron was a mentor of Floyd Sweet, who was his protégé. Sweet worked for the same company, but not on the Network Analyzer project. However, he almost certainly knew the secret of Kron's "open path" discovery and his negative resistor. The present author worked for several years with Sweet, who produced a solid state device (the magnetic Vacuum Triode Amplifier) with no moving parts which produced 500 watts of output power for some 33 microwatts of input power. See Floyd

Sweet and T.E. Bearden, "Utilizing Scalar Electromagnetics to Tap Vacuum Energy," Proc. 26th Intersoc. Energy Conversion Engineering Conf. (IECEC '91), Boston, Massachusetts, p. 370-375.

29. Shoukai Wang and D.D.L. Chung. (1999) "Apparent negative electrical resistance in carbon fiber composites," Composites, Part B, Vol. 30, 1999, p. 579-590. Negative electrical resistance was observed, quantified, and controlled through composite engineering by Chung and her team. Electrons were caused to flow backwards against the voltage, with backflow across a composite interface. The team was able to control the manufacturing process so as to produce either positive or negative resistance as desired. The University at Buffalo filed a patent application. It first placed a solicitation to industry for developments, and offered a technical package to interested companies signing nondisclosure, then suddenly withdrew the offer. It appears to this author that a "fix" may be in place on the development.

30. It is fairly common knowledge that the point-contact transistor could be manufactured to produce a true negative resistor where the output current moved against the voltage. E.g., see William B. Burford III and H. Grey Verner. Semiconductor Junctions and Devices: Theory to Practice, McGraw-Hill, New York, 1965. Chapter 18: Point-Contact Devices. Quoting from p. 281: *"First, the theory underlying their function is imperfectly understood even after almost a century…, and second, they involve active metal-semiconductor contacts of a highly specialized nature. …The manufacturing process is deceptively simple, but since much of it involves the empirical know-how of the fabricator, the true variables are almost impossible to isolate or study. … although the very nature of these units limits them to small power capabilities, the concept of small-signal behavior, in the sense of the term when applied to junction devices, is meaningless, since there is no region of operation wherein equilibrium or theoretical performance is observed. Point-contact devices may therefore be described as sharply nonlinear under all operating conditions."* We point out that the power limitation can be overcome by arrays of multiple point contacts placed closely together.

31. It is the back coupling of the magnetic field from the secondary to the primary windings that forces the dissipation of equal energy in the primary of the transformer as is dissipated in the secondary. If part of the return current in the secondary circuit bypasses the secondary of the transformer, the back field coupling to the primary is reduced accordingly. Using a negative resistor as the bypass, the bypass of the current is "for free" (powered by the vacuum and a negentropic process). Hence the result is a transformer/bypass system with COP>1.0. In that case, such a system can have a positive clamped feedback from the output of the secondary circuit, into the primary to power it, while still having energy remaining to power a load. No laws of physics or thermodynamics are violated, once one understands how an EM circuit is actually powered. E.g., see Bearden, "On Extracting EM Energy from the Vacuum, 2000 (*ibid*.).

32. The Kawai process was seized in the personal presence of the present author and his CTEC, Inc. Board of Directors. We had reached a full agreement with Kawai to manufacture and sell his units worldwide, at great speed. Control of his company, his invention, and Kawai himself was taken over in our presence the very next morning, and the Japanese contingent was in fear and trembling.

33. The magnetic Wankel engine was developed and actually placed in a Mazda automobile. The back mmf of the rotary permanent magnet motor is confined to a very small angle of the rotation. As the rotor enters that region, a sudden cutoff of a small trickle current in a coil generates a momentary large Lenz law effect which overrides the back mmf and produces a forward mmf in that region. The end result is that one furnishes a small bit of energy to convert the engine to a rotary permanent magnet motor with no back mmf, but with a totally nonconservative net magnetic field. For details, see T.E. Bearden, “The Master Principle of EM Overunity and the Japanese Overunity Engines,” Infinite Energy, 1(5&6), Nov. 1995-Feb. 1996, p. 38-55; “The Master Principle of Overunity and the Japanese Overunity Engines: A New Pearl Harbor?”, The Virtual Times, Internet Node www.hsv.com, Jan. 1996.

34. For a history and present status of Japanese organized crime, see Adam Johnston, "Yakuza: Past and Present," Committee for a Safe Society, Organized Crime Page: Japan (available on the Internet). Michael Hirsh and Hideko Takayama, "Big Bang or Bust?" Newsweek, Sept. 1, 1997, p. 44-45.

35. As a ball-park figure for illustration, a nominal electrical circuit or power system actually extracts from the vacuum and pours out into space some 10 trillion times as much energy flow as the poorly designed "single pass" circuits intercept and utilize.

36. But the orthodox scientists do not know it, because they follow blindly the method introduced by Lorentz a century ago. Lorentz arbitrarily discarded all that astounding energy flow that pours from the source dipole, and retained only the tiny, tiny bit of it that strikes the circuit and enters it to power it. Nothing at all has been done since then to capture more of that huge available energy and use it. As a result of the ubiquitous Lorentz procedure, most electrical power system scientists and engineers are no longer aware that the huge unaccounted energy flow not striking the circuit even exists.

37. The interaction of the active vacuum with every electrodynamic system, is not modeled at all by the scientists and engineers designing and building electrical power systems. They unwittingly design every system to enforce Lorentz symmetrical regauging during excitation energy discharge, which in effect forces equilibrium in the vacuum-system energy exchange during that dissipation. Hence classical equilibrium thermodynamics rigorously applies during use of the collected energy. Such systems are limited to COP<1.0 *a priori*.

38. In Nobelist Feynman's words: "*We…wish to emphasize … the following points: (1) the electromagnetic theory predicts the existence of an electromagnetic mass, but it also falls on its face in doing so, because it does not produce a consistent theory – and the same is true with the quantum modifications; (2) there is experimental evidence for the existence of electromagnetic mass, and (3) all these masses are roughly the same as the mass of an electron. So we come back again to the original idea of Lorentz – maybe all the mass of an electron is purely electromagnetic, maybe the whole 0.511 Mev is due to electrodynamics. Is it or isn't it? We haven't got a theory, so we cannot say.* Richard P. Feynman, Robert B. Leighton, and Matthew Sands, Lectures on Physics, Vol. 2, 1964, p. 28-12. Also: "*We do not know how to make a consistent theory – including the quantum mechanics – which does not produce an infinity for the self-energy of an electron, or any point charge. And at the same time, there is no satisfactory theory that describes a non-point charge. It's an unsolved problem." Ibid*., Vol. 2, 1964, p. 28-10. In fact, "energy" itself is actually a very nebulous and inexact concept. Again quoting: "*It is important to realize that in physics today, we have no knowledge of what energy is*." *Ibid*., Vol. 1, 1964, p. 4-2.

39. E.g., a very recent AIAS paper, M.W. Evans et al., "The Most General Form of Electrodynamics," submitted to Physica Scripta, rigorously shows just how wrong the present limited EM theory is. Quoting: *"…there can be no electro-magnetic field [as such] in the vacuum. In other words there can be no electromagnetic field propagating in a source-free region as in the Maxwell-Heaviside theory, which is written in flat space-time using ordinary derivatives instead of covariant derivatives."* The reason is quite simple: spacetime is active and curved. The great John Wheeler and Nobelist Feynman, e.g., realized that EM force fields cannot exist in space, and pointed out that only the *potential* for such fields existed in space, should some charges be made available so that the fields could be developed on them. See Richard P. Feynman, Robert B. Leighton and Matthew Sands, The Feynman Lectures on Physics, Addison-Wesley, New York, Vol. I, 1963, p. 2-4.

40. Max Planck, as quoted in G. Holton, Thematic Origins of Scientific Thought, Harvard University Press, Cambridge, MA, 1973.

41. Arthur C. Clarke, in "Space Drive: A Fantasy That Could Become Reality" NSS ... AD ASTRA, Nov/Dec 1994, p. 38.

42. The internal energy available to a generator is the shaft energy we input to it. In large power plants this is usually by a steam turbine, and heat (from a nuclear reactor, burning hydrocarbons, etc.) is used merely to heat the water in the boiler to make steam to run the steam turbine. Every bit of all that is just so the generator will have some internal energy made available with which it can then forcibly make the dipole. That is all that

generators (and batteries) do: Use their available internal energy to continually make the source dipole —which our engineers design the circuit to keep destroying faster than the load is powered.

43. By "dipole" we mean the positive charges are forced to one side, and the negative charges forced to the other. This internal "source dipole" formed by the generator or battery is electrically connected to the terminals.

44. This has been known in particle physics for nearly 50 years. It stems from the discovery of broken symmetry by C.S. Wu *et al*. in 1957. A dipole is known to be a broken symmetry in its violent energy exchange with the active vacuum. Rigorously this means that some of the "disordered" EM energy received by the dipole from the vacuum, is re-ordered and re-radiated as usable, observable EM energy. Conventional electrodynamics (and power system engineering) do not even model the vacuum's interaction, much less the broken symmetry of the generator or battery dipole in that continuous energy exchange.

45. A pictorial illustration of the enormity of the energy flow through the surrounding space, and missing the external circuit entirely, is given by John D. Kraus, Electromagnetics, Fourth Edn., McGraw-Hill, New York, 1992 — a standard university text. Figure 12-60, a and b, p. 578 shows a good drawing of the huge energy flow filling all space around the conductors, with almost all of that energy flow not intercepted by the circuit at all, and thus not diverged into the circuit to power it, but just "wasted" by passing it on out into space.

46. That is, the interception of the little "boundary layer" or "sheath" of the flow, right on the surface of the wires.

47. Poynting never considered anything but this small little "intercepted" component of the energy flow that actually entered the circuit. E.g., see J.H. Poynting, “On the connexion between electric current and the electric and magnetic inductions in the surrounding field,” Proc. Roy. Soc. Lond., Vol. 38, 1985, p. 168.

48. In technical terms, the closed current loop circuit forces the Lorentz symmetrical regauging condition during the discharge of the excitation energy collected by the circuit. By definition, half the energy is thus used to oppose the system function (i.e., to destroy the source dipole) while the other half of the excitation energy is used to power the external losses and the load. With half the collected energy used to destroy the free extraction of energy from the vacuum, and less than half used to power the load, these ubiquitous circuits destroy their source of free vacuum energy faster than they power their loads. Hence we ourselves have to steadily input shaft energy to the generators so that they can continue to reform the dipole. In the vernacular, that is not the way to run the railroad!

49. Maxwell's seminal paper was published in 1864, as a purely material fluid flow (hydrodynamic) theory. At the time, the electron and the atom had not been discovered, hence the reaction of two opposite charges (positive nuclei, negative Drude electrons) in the wire was not modeled but only one was modeled, etc. Maxwell omitted half the EM wave in the vacuum and half the energy, resulting in the omission of the EM cause and generatrix of Newton's third law reaction from electrodynamics. This omission is present in mechanics and electrodynamics, where the third law reaction appears as a mystical effect without a known cause. The cause and mechanism is the omitted reaction of the observed effect back upon the non-observed cause. General relativity, e.g., does include this reaction mechanism from the effect back upon the cause. But electrodynamicists still omit half the electromagnetics, half the wave, and half the energy as is easily shown. E.g., it is demonstrated in every EM signal reception in a simple wire antenna, when the resulting perturbations of both the positive nuclei and the Drude electrons are correctly attributed to their interactions with the incoming EM fields (waves) from the vacuum.

50. Mario Bunge, Found. Phys., Springer-Verlag, New York, 1967, p. 176.

51. T.E. Bearden, "On Extracting Electromagnetic Energy from the Vacuum, " Proc. IC-2000, St. Petersburg, Russia, July 2000 (in press).

52. T.E. Bearden, "Bedini's Method For Forming Negative Resistors In Batteries," Proc. IC-2000, St. Petersburg, Russia, July 2000 (in press).

53. T.E. Bearden, "Giant Negentropy from the Common Dipole," Proc. IC-2000, St. Petersburg, Russia, July 2000 (in press).

54. E.g., a good short summary is given by Dr. Theodore Loder, Institute for the Study of Earth, Oceans, and Space (EOS), University of New Hampshire, Durham, NH in his short paper, "'Comparative Risk Issues' Regarding Present and Future Environmental Trends: Why We Need to be Looking Ahead Now!", prepared for the Senate Committee on the Environment and Public Works, June 1, 2000. Certainly Dr. Loder and EOS can fully expound on the details of the biospheric pollution from the various contributing factors and processes.

55. One need only regard the vehement attacks by the scientific community (and much of the government including national laboratories) upon cold fusion researchers, to understand why presently many inventors and scientists in the COP>1.0 open dissipative energy field are openly suspicious and distrustful of the government and government scientists, to put it mildly. Further, the U.S. Patent Office is known to be under rather explicit instructions not to issue patents on COP>1.0 electrical processes and systems.

56. E.g., the well-known Bohren experiment produces 18 times as much energy output as the operator must input. The excess energy is extracted directly from the vacuum. There has been no program, to my knowledge, seeking to exploit this well-proven COP>1.0 mechanism that has been in the hard science literature for some time. See Craig F. Bohren, "How can a particle absorb more than the light incident on it?" Am. J. Phys., 51(4), Apr. 1983, p. 323-327. Under nonlinear conditions, a particle can absorb more energy than is in the light incident on it. Metallic particles at ultraviolet frequencies are one class of such particles and insulating particles at infrared frequencies are another. For independent validation of the Bohren phenomenon, see H. Paul and R. Fischer, {Comment on "How can a particle absorb more than the light incident on it?'},” Am. J. Phys., 51(4), Apr. 1983, p. 327.

57. G. Johnstone Stoney, “Microscopic Vision,” Phil. Mag. Vol. 42, Oct. 1896, p. 332; , “On the Generality of a New Theorem,” Phil. Mag., Vol. 43, 1897, p. 139-142; “Discussion of a New Theorem in Wave Propagation,” Phil. Mag., Vol. 43, 1897, p. 273-280; “On a Supposed Proof of a Theorem in Wave-motion,” Phil. Mag., Vol. 43, 1897, p. 368-373.

58. E. T. Whittaker, “On the Partial Differential Equations of Mathematical Physics,” Math. Ann., Vol. 57, 1903, p. 333-355.

59. Evans in a private communication has pointed out that Whittaker's method depends upon the Lorentz gauge being assumed. If the latter is not used, the Whittaker method is inadequate, because the scalar potential becomes even more richly structured. My restudy of the problem with this in mind concluded that, for the negentropic vacuum-reordering mechanism involving only the dipole and the charge as a *composite* dipole, it appears that the Whittaker method can be applied without problem, at least to generate the minimum negentropic process itself. However, this still leaves open the possibility of additional structuring, so that the actual negentropic reordering of the vacuum energy (and the structure of the outpouring of the EM energy 3-flow from the charge or dipole) may be much richer than given by the simple Whittaker structure alone. In other words, the Whittaker structure used in this paper should be regarded as the *simplest* structuring of the negentropic process that can be produced, and hence a lower boundary condition on the process.

60. Time-like currents and flows do appear in the vacuum energy, if extended electrodynamic theory is utilized. E.g., in the received view the Gupta-Bleuler method removes time-like photons and longitudinal photons. For disproof of the Gupta-Bleuler method, proof of the independent existence of such photons, and a short description of their characteristics, see Myron W. Evans *et al*., AIAS group paper, "On Whittaker's F and G Fluxes, Part III: The Existence of Physical Longitudinal and Time-Like Photons," J. New Energy, 4(3), Winter 1999, p. 68-71; "On Whittaker's Analysis of the Electromagnetic Entity, Part IV: Longitudinal Magnetic Flux and Time-Like Potential without Vector Potential and without Electric and Magnetic Fields," *ibid*., p. 72-75. To see how such entities produce ordinary EM fields and energy in vacuo, see Myron W. Evans *et al*., AIAS group paper, "On Whittaker's Representation of the Electromagnetic Entity in Vacuo, Part V: The

Production of Transverse Fields and Energy by Scalar Interferometry," *ibid*., p. 76-78. See also Myron W. Evans *et al.*, AIAS group paper, "Representation of the Vacuum Electromagnetic Field in Terms of Longitudinal and Time-like Potentials: Canonical Quantization," *ibid*., p. 82-88.

61. For a short treatise on the complex Poynting vector, see D.S. Jones, The Theory of Electromagnetism, Pergamon Press, Oxford, 1964, p. 57-58. In a sense our present use is similar to the complex Poynting energy flow vector, but in our usage the absolute value of the imaginary energy flow is equal to the absolute value of the real energy flow, and there is a transformation process in between. This usage is possible because the imaginary flow is into a *transducer*, which takes care of transforming the received *imaginary* EM energy into the output *real* EM energy. We stress that the word "imaginary" is not at all synonymous with *fictitious*, but merely refers to what "dimension" or state the EM energy exists in.

62. Unfortunately electrical engineers use the term "power" to also mean the rate of energy flow, when rigorously the term "power" means the rate at which work is done. We accent that we fully understand the difference, but are using the terminology common to the profession.

63. Nobelist Prigogine experienced something very similar when he proposed his open dissipative systems, where the system operations did not lead to the conventional increasing disorder. To say that he was subjected to the Inquisition is not an exaggeration. Other scientists have repeatedly been subjected to intense scientific attack and suppression — including Mayer (conservation of energy), Einstein (relativity), Wegener (drifting continental plates), Ovshinsky (amorphous semiconductors), to name just a few of the hundreds who have been attacked in similar fashion. Science does not proceed by sweet reason, but by a vicious dogfight with no holds barred. It delights in "wolf pack" attacks upon the scientist with a new idea or discovery.

64. And the scientific community is certainly not prepared for the notion of using time as energy, freely and anywhere. In a sense, one can "burn time as fuel". Consider this: In physics, the choice of fundamental units in one's physics model is completely arbitrary. E.g., one can make a quite legitimate physics model having only a single fundamental unit (such is already done in certain areas of physics). E.g., suppose we make the "joule" (energy) the only fundamental unit. It follows then that everything else — including the second and therefore time — is a function of energy. One can utilize the second as c^2 joules of energy. Hence the flow of time would have the same energy density as mass. After Einstein, the atom bomb, and the nuclear reactor, of course, we are all comfortable with the fact that mass is just spatial energy compressed by the factor c^2. So we really should not be too uncomfortable at the notion that time itself is energy compressed by the factor c^2. In this case, if every second of the passage of time, we were to convert one microsecond into ordinary EM spatial energy, we would produce some 9×10^{10} joules of EM energy. Since that is done each second, this would give us the equivalent of the output of 90 1000-megawatt power plants. If only 1.11% efficient, the conversion process would yield the equivalent of one 1000-megawatt power plant.

In fact, it is in theory possible to do such a conversion, and we have previously indicated the various mechanisms involved. There are also some rough experimental results that are at least consistent with the thesis. The interested reader is referred to T.E. Bearden, "EM Corrections Enabling a Practical Unified Field Theory with Emphasis on Time-Charging Interactions of Longitudinal EM Waves," J. New Energy, 3(2/3), 1998, p. 12-28. See also the author's similar paper with the same title, in Explore, 8(6), 1998, p. 7-16. We believe that the real energy technology for the second half of this century is based on use of time for fuel. The fundamental reactions and principles also enable a totally new form of high energy physics reactions, where very low spatial energy photons are the carriers (their time components carry canonical time-energy, so that the highest energy photons of all, given time-energy conversion, are low frequency photons. These new reactions (given in the references cited) are indeed consistent with the startling nuclear transformation reactions met at low (spatial) photon energies in hundreds of successful cold fusion experiments worldwide.

65. A classic example is given by Paul Nahin in his Oliver Heaviside: Sage in Solitude, IEEE Press, New York, 1988, p. 225. Quoting: *"J.J. Waterston's paper on the kinetic theory of gases, in 1845, was rejected by the Royal Society of London. One of the referees declared it to be 'nothing but nonsense, unfit even for reading*

before the Society.' ... "Waterston's dusty manuscript was finally exhumed from its archival tomb forty years later, because of the efforts of Lord Rayleigh..." Our comment is that the same scientific attitude and resistance to innovative change prevails today. As the French say, *"Plus ça change, plus c'est la même chose!"*

66. E.g., see G. Nicolas and I. Prigogine, Exploring Complexity, Piper, Munich, 1987 (an English version is Exploring Complexity: An Introduction, Freeman, New York, 1989); Ilya Prigogine, From Being to Becoming: Time and Complexity in the Physical Sciences, W.H. Freeman and Company, San Francisco, 1980. In 1977 Prigogine received the Nobel Prize in chemistry for his contributions to nonequilibrium thermodynamics, especially the theory of dissipative structures.

67. The interested reader is referred to Andrew A. Marino, Powerline Electromagnetic Fields and Human Health, at http://www.ortho.lsumc.edu/Faculty/Marino/Marino.html. Particularly see "Chapter 5, Blue-Ribbon Committees and Powerline EMF Health Hazards," and "Chapter 6: Power-Industry Science and Powerline EMF Health Hazards." Biophysicist Marino is one of the leaders in the field and has been personally involved in many skirmishes with powerline-dominated studies and findings. As an example, quoting from Chapter 6: *"Neither scientists nor the public can rely on power-industry research or analysis to help decide whether powerline electromagnetic fields affect human health because power-industry research and analysis are radically misleading."* There are many other reports in the literature which also show effects of EM nonionizing radiation on cells, including detrimental effects.

68. Becker studied not just the immune system — which "heals" nothing at all, not even its own damaged cells — but also the cellular regenerative system. He and others found, e.g., that tiny trickle currents and potentials — either steady or pulsed — placed across otherwise intractable bone fractures, would result in a rather astounding set of cellular changes which led to healing of the fracture by deposit of new bone. Eerily, Becker showed that the red blood cells coming into the area and under the EM influence, would shuck their hemoglobin and grow cellular nuclei (i.e., dedifferentiate back to an earlier cellular state). Then these cells would redifferentiate into the type of cells that made cartilage. Then those cells would differentiate into the type of cells that make bone, and be deposited in the fracture to "grow bone" and heal the fracture. Incredibly, this is the only true "healing" modality in all Western medical science — which is otherwise built upon the theory of intervention rather than healing. After the intervention (which may be quite necessary!), the body's cellular regenerative system — or what is left of it after damage by such interventions as chemotherapy, etc. — is left entirely upon its own to restore the damage (heal the damaged cells and tissues). Becker was twice nominated for a Nobel Prize. But because he also testified in court against power companies, giving testimony as an expert witness that EM radiation from power lines could indeed induce harmful conditions in some exposed people, he was suppressed and eventually forced to retire.

69. See Robert O. Becker and Andrew A. Marino, Electromagnetism and Life, State University of New York Press, Albany, 1982. This reference gives a nice summary of EM bioeffects from the orthodox view, current as of the publication date. For Becker's work with the cellular regenerative system, see particularly R.O. Becker, "The neural semiconduction control system and its interaction with applied electrical current and magnetic fields," Proc. XI Internat. Congr. Radiology, Vol. 105, 1966, p. 1753-1759, Excerpta Medica Foundation; Amsterdam. See Becker, "The direct current field: A primitive control and communication system related to growth processes," Proc. XVI Internat. Congr. Zoology, Washington, D.C., Vol. 3, 1963, p. 179-183.

70. For an overview of the ansatz of present battery technology, see David Linden, Editor in Chief, Handbook of Batteries, Second Edition, McGraw Hill, New York, 1995; Colin A. Vincent and Bruno Scrosati, Modern Batteries: An Introduction to Electrochemical Power Sources, Second Edition, Wiley, New York, 1997. For a process to make a battery include a negative resistor and exhibit COP>1.0, see Bearden, "Bedini's Method For Forming Negative Resistors In Batteries," Proc. IC-2000, St. Petersburg, Russia (in press).

71. Such laboratories are private and professional testing companies, where the U.S. government has certified their expertise and qualifications, their testing to NIST, IEEE, and U.S. government standards, their use of calibrated instruments, and the experience and ability of their professional test engineers and scientists. Such

labs are routinely and widely used by aerospace firms, e.g. A Test Certificate from such a lab is acceptable by the courts, the U.S. Patent and Trademark Office, the U.S. government (which requires it on many contracts), and by the U.S. scientific community. A goodly number of these laboratories are available throughout the U.S.

72. As an example, for decades Castro ran guerrilla and agent training camps in Southern Mexico. Many of the graduates of those camps — trained terrorists all — have been infiltrated across the U.S. border and into the U.S., to bide their time and wait for instructions. Some estimates are that several thousand such Castro agents alone are already on site and positioned for sabotage, poisoning of water supplies, destruction of transmission line towers, destruction of key bridges, etc. Several other nations hostile to the U.S. are also known to have agent teams already on site within the U.S., The new form of warfare/terrorism is to introduce the "troops" into the adversary's nation and populace in advance, as well as weapons caches, etc. So such preparations have definitely been accomplished within the United States, and undoubtedly some are still in progress and ongoing.