ERRORS AND OMISSIONS IN THE CEM/EE MODEL

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ABSTRACT

Major errors exist in the classical electromagnetic/electrical engineering (CEM/EE) model, as pointed out by Feynman, Wheeler, Bunge, etc. The errors, implications, and a short history of the model’s development and truncation are presented.

Whittaker proved that every EM field and potential is a set of ongoing free energy flows. However, with its source of potential energy flow connected as a load while physical current flows, the closed current loop circuit self-enforces Lorentz symmetry and kills its source. Lorentz reusing symmetry enforced on the model and circuitry arbitrarily excludes permittively asymmetric Maxwellian systems using free asymmetric reusing energy to provide COP > 1.0 (overunity coefficient of performance). Rigorous proof that discarding the Lorentz condition produces energy from the vacuum system is given by Evans et al., as also by Linnet and by Linnett and Roy.

A replicable magnetic engine is presented with zeroed back muf, exemplifying a COP > 1.0 nonequilibrium steady state (NESS) EM system analogous to a home heat pump. Adding clamped positive feedback provides a COP = ∞ system freely receiving all its input energy from asymmetrical reusing, analogous to a solar cell array power system.

As one benefit, the solution to the dark matter and dark energy problems arises from the corrections. Dark matter (Dirac sea hole curvatures) and dark energy (negative energy EM fields and potentials) can readily be evoked in circuits and systems on the laboratory bench, and their odd phenomenology explored and determined.

The flawed CEM/EE model should be corrected with highest priority. Asymmetric COP > 1.0 electrical power systems should be rapidly developed—resolving the escalating world energy crisis while dramatically reducing biospheric pollution, global warming, and the cost of energy.

FOREWORD


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The discussions in the paper show several very significant findings:

1. Contrary to orthodox view and teaching, COP > 1.0 and COP = ∞ in electrical power systems—using asymmetrical reusing and free input of excess energy by the environment to freely increase their potential energy for subsequent use in freely powering loads—are permitted by both physics and thermodynamics. They are permitted by the Maxwell-Heaviside theory prior to its Lorentz symmetrical reusing.

2. Such CEM/EE systems are and have been arbitrarily excluded in our standard electrical power engineering practice by (a) Lorentz’s 1892 symmetrizing of the Maxwell-Heaviside equations, thus arbitrarily excluding the entire class of permissible asymmetric Maxwellian systems, and (b) the standard practice of building and using only that small class of Maxwellian circuits and systems that self-enforce Lorentz symmetry and COP=1.0 when the free reusing energy is utilized. These two actions have been raised to a scientific dogma welded in concrete and rigorously enforced.

3. A long list of falsehoods and flaws in the standard CEM/EE model has been pointed out by eminent scientists to no avail. For more than a century, our own scientific community has adamantly promulgated these known falsehoods, regardless of who pointed them out—boiling scientific ethics itself into serious question.

4. There is presently little or no movement at all in our scientific community to correct these glaring errors and practices. To the contrary, there is even stronger determination to keep right on promulgating and enforcing them, to the ever increasing detriment of humanity, the environment, and the ethics of science itself.

5. The source charge problem—key to self-powering, fuel-free electrical power systems—has been scribbled from all the texts. There are no texts that discuss the implications of Lorentz’s symmetrical reusing of the equations, or that discuss the implications of the self-enforced Lorentz symmetry of our standardized circuits. The continuing false use of force fields in space—a total contradiction even pointed out by Feynman in his three volumes of sophomore physics—is particularly inexcusable, as it is never explicitly stating that the potential energy, and EM system can be freely charged at will, either symmetrically or asymmetrically, and this is guaranteed by the gauge freedom axiom of quantum field theory.

6. There is no “availability of energy” crisis and never has been. Instead, there is a continuing crisis of scientific mindset—accompanied by elevating Lorentz-symmetric equations and circuits to a universally accepted scientific dogma.

7. The energy crisis and much of the pollution of the biosphere, as well as the increasing contribution to global warming, can be rather quickly, cheaply, cleanly, and permanently solved, whenever our leading scientific organizations will undertake it. We speak of our great scientific organizations including the National Academy of Sciences, National Academy of Engineering, National Science Foundation, Department of Energy, the great National Laboratories, and our universities and many others.

This problem can easily be solved and corrected anytime the U.S. scientific community will allow the work and fund it, and not run the careers of scientists—particularly young doctoral candidates and post doctoral scientists who try to work in this area. We therefore urge the leaders of the scientific community to take the strongest possible action to correct this inexcusable century-old scientific blunder and restore ethics to science.
ABSENCE OF FORCE IN MASS-FREE SPACE

To begin our thesis that the classical electromagnetics and electrical engineering (CEM/EE) contains many modeling errors, we open with a quote from Mark Bunge:

"If it is not usually acknowledged that electrodynamicism, both classical and quantum, are in a sad state." (Bunge, 1967, p. 176).

One of the areas in sad state is the improper use of force and field fields, leading to real problems in the "definition" of force. Feynman says it in his own words:

"If dealing with force the tacit assumption is always made that the force is equal to zero unless some physical body is present... One of the most important characteristics of force is that it has a material origin, and this is not a definition. If you insist upon a precise definition of force, you will never get it." (Feynman et al., 1964, Vol. 1, p. 12).

Feynman also explains that the EM field in space is force-free, and only has the potential to produce force when interacting with charged matter:

"[T]he existence of the positive charge, in some sense, distorts, or creates a 'condition' in space, so that when we put the negative charge in, it feels a force. That potentiality for producing a force is called an electric field." (Feynman et al., 1964, Vol. 1, p. 24).

Classical electrodynamicists do not comply with Feynman’s indication of nature.

"Most classical electrodynamicists continue to adhere to the notion that the EM field force exists as such in the vacuum, but do admit that physically measurable quantities such as force somehow involve the product of charge and field." (Jackson, 1975, p. 249).

Yet almost a century ago, Björkens—who had attended Poisson’s electrodynamics lectures in France and had personally assisted Herz in Bonn for two years—clearly stated that these problems were recognized even then though unresolved, just as they are still unresolved today. Quoting Björkens:

"The idea of electric and magnetic fields of force was introduced by Faraday to avoid the mysterious idea of a action at a distance. After the victory which Maxwell’s theory gained through the experiments of Hertz, the idea of these fields took its place among the most splendid of theoretical physics. And yet if we ask, what is an electric or magnetic field of force? No one will be able to give a satisfactory answer. We have theories relating to these fields, but we have no idea whatever of what they are intrinsically, nor even the slightest idea of the path to follow in order to discover their true nature. Above all other problems which are related to fields of force, and which occupy mind and heart, we have, therefore, the problem of fields of force, namely, the problem of their true nature..." (Björkens, 1913).

This also is consistent with modern physics, e.g., in quantum field theory the force on a mass is due to the ongoing interaction of virtual particles with that mass. E.g., Atchinson states:

"Forces, in quantum field theory, are understood as being due to the exchange of virtual quanta..." (Atchinson, 1985, p. 372).

Jackson admits that most classical electrodynamicists still erroneously assume an EM field force in space, but they also illogically assume that somehow it is nonobservable (even though force is an observable) and so observable charged mass must be present to allow the interaction product of $E$ and $q$, where $F$ is observed. This notion assumes first that EM field exists in the absence of mass but is not observable, but then it becomes observable after interacting with charged matter. Also, what Jackson does admit is that—just as it exists in space—is nonobservable.

Thus Jackson clearly admits a major non sequitur but continues to neglect this falsity that has been propagated in CEM/EE for more than 100 years. The falsity is still taught to every electrical engineer and in every university. Extant CEM/EE texts detail the calculation of the force $F$-field in charged matter, and erroneously present it as a calculation of the $F$-field existing in mass-free space. This is a fundamental and far-reaching falsity in all present CEM/EE texts.

Basic mechanics also err when it assumes a mass-free vector force in space, acting upon a separate mass. So no such situation exists, simply from again examining $F = q(E + v \times B)$. Substitute $v = 0$, and immediately $F = 0$. As stated, the mass is in fact a component of the force that is produced by the interaction of a vector force-free “condition in space” with that mass $m$. Thus the interacting vector entity (which exists alone in space prior to its interaction to $\mathbf{F}$) cannot recognize that mass is a component of force—has been in basic mechanics for more than 300 years, and it continues to be propagated without objection and without correction.

SHORT HISTORY OF MAXWELL’S THEORY

Maxwell’s original theory is 20 quaternion-like equations in 20 unknowns (Maxwell, 1865, Torrance, 1996). Maxwell and others assumed the material after, so to them there was no point in the universe where mass was absent. Hence Maxwell’s own EM fields in space are also erroneously force fields in mass—field forces in the material other—which today we know is false because there is no observable ether (Michelson and Morley, 1887, 1886).

Even during Maxwell’s own lifetime his theory did not gain its eventual great credibility and prestige. Not until 1888 when Hertz (i) demonstrated the EM waves originally predicted by Maxwell (and by the subsequent Heaviside truncation), and (ii) measured their speed as the speed of light, did the Maxwell theory come into such prominence. That was nine years after Maxwell’s death in 1879.

The first edition (Maxwell, 1873) of Maxwell’s famous Treatise was published eight years after his fundamental 1865 paper and contained essentially the same theory. But other scientists and his own publisher harshly criticized Maxwell for employing Hamilton’s quaternion algebra (Hamilton, 1857) which was deemed puzzling and incredibly complicated—and was bitterly hated.

With such criticism of his fledgling theory and of the very first edition of his Treatise, Maxwell then began intensifying his own model and equations and reducing the complexity of his own theory. He had completed drastically curtailing about 80% of his own Treatise when he died in 1879 of stomach cancer. For the second edition of his Treatise (Maxwell, 1881) published two years after his death, that 80% of the first edition was replaced with Maxwell’s own drastic simplification. Similarly the third edition (Maxwell, 1892) completely replaced the first, with added comments etc.

So the standard third edition of Maxwell’s Treatise, widely available today and accepted as “Maxwell’s original theory,” is in such a thing. It is a great simplification and reduction of his theory, and a pale shadow of the original.

But the quaternion EM field remained, then the latter theory of general relativity would almost certainly have been forgotten after truncation into quaternion form, thereby providing a complete unified field theory. Quoting Sachs:

"[T]he factorization of Einstein’s field equations to the quaternion form fully utilizes the gravitational and electromagnetic manifestations of interacting charged matter." (Sachs, 1999, p. 123).

Following Maxwell’s death, in the 1880s and 1890s several scientists (Heaviside, 1885-1887 and later, Gibbs, 1913, Hertz, 1887, 1893) ripped the quaternions apart, greatly truncating the theory and using vector algebra, etc.

This vector truncation was a greatly curtained treatment of Maxwell’s original quaternion theory, and together with Maxwell’s own truncation it essentially spelled the end of the Maxwell’s quaternion EM theory. Barrett describes the result as follows:

"[T]he field for the potentials was banished from playing the central role in Maxwell’s theory and relegated to being a mathematical (but not physical) auxiliary. This hastened the fact that the Maxwell’s theory... has Heaviside... and Hertz. The ‘Maxwell’s theory’ and Maxwell’s ‘equations’ we know today are really the interpolation of Heaviside... Heaviside took the 20 equations of Maxwell and reduced and simplified to the fine line of ‘Maxwell’s equations’.” (Barrett, 1993, p. 11).

What today are taught in university as “Maxwell’s equations” are not at all that. They are actually Heaviside’s greatly curtained equations and Heaviside’s notation—as even further simplified and reduced by Lorentz (Lorentz, 1892).

In 1892 Lorentz put the final coup de grace on Maxwell’s theory, by symmetrically regauging (Lorentz, 1999) the already watered down equations of Heaviside. That symmetrizing action arbitrarily discarded all asymmetrical Maxwellian systems. A priori, Lorentz symmetrizing retains only those Maxwellian systems that are freely and symmetrically regauged. It is implicitly assumed that a physical mechanism is present and enforcing Lorentz symmetry. We shall meet that subtle physical mechanism shortly.

The arbitrarily discarded asymmetric Maxwellian systems can have magnificently capable systems. Although the thermodynamic efficiency of any system is always less than 100%; the rejected asymmetric system performance can exhibit an overunity coefficient of performance (COP > 1.0) by use of asymmetric free EM regauging energy received from the active vacuum/plexite environment. These asymmetric systems can function with COP > 1.0 analogous to the common home hot pump, or even at COP ≈ ∞.
analogously to a solar cell array power system, a windmill-driven power system, etc. All that is necessary is that the environment freely input most or all of the input energy required.

Every electrodynamicist already assumes free regenerating, and thus assumes that the potential energy of a system can be changed freely and at will. However, the electrodynamicist has been trained since Lorentz (Lorentz, 1892, Jackson, 1999) to insist that the system's potential energy must be "symmetrically" changed, so that the excess free energy can only be locked up as stress of the system, incapable of use to freely power loads. To power the loads, the symmetrical system must also cut off the environmental influx of free potentialization energy as fast as it powers its losses and loads—which is faster than it powers its load.

When current is flowing in such symmetrized systems, half the free excitation energy is used to destroy the dipoles at the source of potential; while the other half is dissipated to power the external circuit's losses and loads. To restore the dipolarity of the source, to excite potential energy again flows onto the circuit, the operator must input at least as much energy to again force the charges apart and remake the dipole, as was used to scatter the charges and destroy it. Hence the operator is always inputting more energy to restore the dipole than the energy dissipated to do useful work in the load. In short, the standard symmetrized regenerating system self-forces its own output.

All asymmetrical Maxwellian systems having \( C > 1 \) by energy from the vacuum were arbitrarily discarded by Lorentz's symmetrical regenerating of the equations, just to make easier to solve algebraically. So to escape the use of symmetrical methods, the already dramatically reduced EM model of Heaviside, Gibbs, and Hertz was further fractionalized by Lorentz and only a small symmetrized Maxwellian system was retained. Lorentz unquestioningly discarded all \( C = 1 \) by asymmetrical regenerating Maxwellian systems, teaching everyone else to continue to do so as well.

Nature and thermodynamics do not exclude asymmetrical Maxwellian \( C > 1 \) electrical power systems freely taking their energy from asymmetrical regenerating and using that energy to power loads freely. Nonqualibrium thermodynamics could care less whether the \( C = 0 \) NNESS system freely receiving and using excess energy from its active environment receives the usable energy in fluid, mechanical, or electromagnetic form. But the present CEMEE model does obviously omit such EM systems, and it has since the 1890s and Lorentz's symmetrical regenerating. Since the symmetrized regenerating solar cell array electrical power system taking its excess energy from the EM solar radiation from the environment is possible with its \( C = 0 \), then from the thermodynamics viewpoint asymmetrical regenerating \( C = 0 \) electrical power systems taking their excess energy from the vacuum EM energy are feasible. What is important is that the energy be furnished in a form usable by the system. All usable EM energy already comes from the vacuum, via the source charges; hence obviously the use of any EM energy is already the use of EM energy for electrical engineering. No one political community is responsible for the forced absence of self-powering, fuel-free electrical power systems taking their input energy freely from the active vacuum and curved space time via free asymmetrical regenerating the community also bears responsibility for a century-long delay in the progress of energy science, for the world energy crisis itself, for the pollution of the planet by use of energy methods, and for the misadventure economic state of many poor nations and peoples worldwide who cannot achieve the cheap energy necessary for a viable national economy and a decent standard of living.

The ethos and pathos of the situation cries out for immediate and strong corrective action by the scientific community.

LIST OF MAJOR FLAWS AND FALTIES IN THE CEMEE MODEL

The CEMEE model contains many flaws and fallacies. As a partial listing, the model assumes:

1. The material ether. This was falsified in 1887 (Michelson and Morley, 1886, 1887). Maxwell himself assumed this error, and the catatonic equations have never been corrected to eliminate their implicit material ether assumption.

2. Force fields in space. Force fields actually exist only in matter, per previous discussion. This fallacy continues to be propagated and ignored, even though eminent scientists such as Feynman, Wheeler, and Bunge have pointed it out, including even in astrophysics papers (Feynman et al., 1984, Vol. 1, p. 24-12).

3. d for spacetime. This was falsified in 1916 by general relativity (Einstein, 1916).

When the energy density in an EM circuit or system changes, the energy density of spacetime (ST) changes, constituting a change of ST shape. This ST curvature then interacts back upon the system, producing free forces. It also interacts back upon the vacuum, changing its vacuum particle flux. With the reaction forces created in the mass by the curved ST interaction, then whether or not there are net free forces remaining in the system to do free work in loads depends upon whether the system is made symmetric or asymmetric in its respective application of the free regenerating forces and the free regenerating energy.

Nonetheless, the spacetime cannot be flat, if any symmetrical or symmetrical forces at all exist in the CEMEE system. Indeed, given a single charged particle in the universe, all spacetime is curved a priori as pointed out by Sachs. If the forces are symmetrical, the net force resultant is zero even though asymmetric forces have appeared in the system and are still there and are still acting on the system. With the system force having a resultant zero vector, the excess free EM regenerating energy from the curved ST is locked up as a change in the physical state of the vacuum and cannot be dissipated just to perform free work. Instead, half will be used to destroy the dipolar source of potential, and the remaining half will be dissipated in the internal circuit's losses and loads. If the net force resultant is non-zero (i.e., if the regenerating is asymmetrical so that a net force field results), then the free regenerating EM energy can be dissipated by that net force free to perform ST work on the loads.

4. An inert vacuum. This has been falsified since at least 1950 by the advent of the Dirac Sea Theory (Dirac, 1930) and the development of quantum mechanics and particle physics. In quantum field theory, all particles are generated in interactions with mass of virtual particles in vacuum. Hence the vacuum cannot be inert, and spacetime cannot be flat, if any forces at all exist anywhere in the CEMEE system. Evans points this out as follows:

"This fundamental result of differential geometry implies that electromagnetic energy can be transmitted from a source to a receiver by scalar curvature \( R \) and that electromagnetic energy is present in non-Euclidean spacetime. All fields in nature are fundamentally dependent upon, and originate in, scalar curvature \( R \)." (Evans, M., 2004).

Similar considerations to those of number 3 above do apply.

5. That "static" EM fields are fixed. Instead, they are comprised of moving internal EM energy flows. In CEMEE they are treated as analogous to a frozen waterfall. Instead, they are analogous to an unk frozen waterfall. Quoting Van Flandern:

"To retain causality, we must distinguish two distinct meanings of the term 'static'. One meaning is unchanging in the sense of time; the other meaning is unchanging in the sense of space. Both are essentially the same at every moment, yet the latter has moving parts capable of transferring momentum, and is therefore an entity in dynamic equilibrium. ...As are the fields for a rigid, stationary source frozen, or are they continually regenerated? Causality seems to require the latter." (van Flandern, 1998, p. 8-9).

The fields and potentials represent continuous flows of EM energy (real observable photons) emitted at light speed from their associated source charges. The emitted photons continually establish and replenish these EM energy flows—and the resulting associated fields and potentials—at light speed. This continuous outflow of spreading observable real EM energy (observable photons) from any change or dipolarity is easily measured experimentally, as is the fact that no observable energy input is provided to the source charge in this process.

This leads to the long-voicing source charge problem—so solved by the present author and published in 2000 and subsequently (Hearden, 2000, 2002). The source charge problem has been pointed out but not solved by a number of physicists. E.g., Sen states:

"The connection between the field and its source has always been and still is the most difficult problem in classical and quantum electrodynamics." (Sen, 1968, p. viii).

Kosyakov states the source charge problem more directly:

"A generally acceptable, rigorous definition of radiation has not as yet been formulated. ...The question of how a field can be said to emit radiation which is not absorbed by the object producing it has been left unanswered. ...Why is it that an electric radiation radiates but does not absorb light waves despite the fact that the Maxwell equations are invariant under time reversal?" (Kosyakov, 1992, p. 135, 141).

The charge requires an observable electromagnetic input to produce a continual observable energy output. Prior to 2000, the source charge problem had not been solved, but it had been scoured from all the CEMEE textbooks. With the proposed solution in hand, the present author has nominated the source charge as the first known physical system producing continuous negative entropy as theoretically shown possible (Evans, and Rondoni, 2002). We have also nominated the source charge as a Feynman ratchet (Demur, 2004) and a true Maxwell's Demon (Maxwell, 1871).

Either the source charge problem destroys the entire conservation of energy law because the charge creates—in some way or all, the observable output energy continually flowing from it, or else the source charge must absorb virtual state disordered energy, reorder it (a negative entropy operation falsifying the present second law of thermodynamics), symmetrically integrate ordered virtual energy to the observable (quantum) threshold, and abruptly decay from the quantum threshold excitation by re-emitting the energy as an observable photon. The second alternative mechanism is precisely what the charge does, and continually.

Continual iterative performance of this mechanism means that the source charge is an example of the controllable Feynman ratchet (Feynman et al., 1984) continually consuming positive entropy of the virtual state fluctuations of the vacuum and producing negative entropy in the observable state. This is also in accord with the mathematical demonstration that such systems are theoretically possible (Evans, and Rondoni, 2002). Therefore the source charge and its associated EM fields and potentials (and their energy) either (i) falsify both the first and second laws of thermodynamics, or (ii) obey a slightly extended to cover the virtual state law when studying the present second law. The latter alternative is the case in nature, but CEMEE assumes the former. In this paper we again present our formal construction and extensions of the second law.

6. That all EM field energy and potential energy has been freely created from nothing at all. First, the model assumes that every EM field, EM potential, and joule of EM energy in the universe is produced from its associated source charge(s), which is true. But the model further assumes that all the field energy and potential energy has been freely created by the source charge(s) from nothing at all, which is false. So the CEMEE model assumes a total violation of the conservation of energy law (the first law of thermodynamics) as well as of the second law (see discussion under items 5 and 6, above), by every EM field, EM potential, and joule of EM energy in the
universe as well as every charge and dipole in the universe. Hence either the CEM/EEM model is terribly wrong, or more positive contributions are actually wrong. Quantum field theory already includes formation of observable EM energy by interaction of nonobservable energies. Thus it directly points toward the author’s charge model is also terribly wrong.

7. That the scalar potential is a basic entity and has no internal structure and dynamics. This erroneous assumption has been falsified for more than a century (Whittaker, 1903). In quantum field theory (e.g., Mandula 1989; Whitaker, 1984, 1993) the longitudinal photon and the scalar (time-polarized) photon are individually nonobservable, but their paired combination is observable as electromagnetic scalar potential (common voltage). Hence the scalar potential (consequence of equivalence) decomposes into pairings of flowing time-polarized waves and longitudinal waves of common polarization.

8. That the EM field is also basic and has no internal structure and dynamics. This erroneous assumption has also been falsified by Whittaker for more than a century (Whittaker, 1903, 1994).

9. That the isolated source charge is finite and does not polarize its surrounding “vacuum.” To the contrary, modern particle physics shows that the charge does indeed polarize the surrounding active vacuum, and that the vacuum has structure and dynamics, and is active. The erroneous “finite” vacuum “assumption of the CME/EEM model ignores the associated symmetry of opposite charges that accompanies any charge and the opposite charges of its polarization ensemble. Further, the bare charge inside the polarization screen is infinite, as is the screening virtual charge surrounding it. The difference between these two infinite charges, however, is finite and is what our instruments observe of the internal infinite bare charge. The is broken symmetry, the source charge ensemble continually consumes positive entropy of the virtual state vacuum, transducing it to negative entropy of the observable state—fully realizing the present incomplete second law of thermodynamics. Indeed, broken symmetry implicitly requires that something virtual has become observable. Quoting Lee: “Since non-observables imply symmetry, these discoveries of symmetry must imply observables.” (Lee, 1981, p. 181).

Broken symmetry of opposite charges (and thus of any charge’s polarization ensemble) was experimentally proven in 1957 ( Wu et al., 1957) after earlier prediction by Lee and Yang (Lee, 1956; Lee et al., 1957). So revolutionary was the advent of broken symmetry in physics that the Nobel Prize was quickly awarded to Lee and Yang—in December 1957—for their revolutionary prediction.

The “isolated charge” also polarizes the vacuum, involving two infinite charges, as shown by quantum field theory. E.g., Nobelist Weinsten states: “The total energy of the atom depends on the bare mass and bare charge of the electron, the mass and charge that appear in the particle theory before we start worrying about photon emissions and reabsorptions. But five electrons as well as electrons in atoms are always emitting and reabsorbing photons that effect the electron’s mass and electric charge, and so the bare mass and charge are not the same as the measured electron mass and charge that are listed in tables of elementary particles. In fact, in order to account for the observed values (which of course are finite) of the mass and charge of the electron, the bare mass and charge are required. This is so by virtue of the quantum theory of electromagnetic fields.” (Weinberg, 1969, p. 109-110).

So any “isolated charge” is actually an ensemble consisting of an infinite (finite) bare charge surrounded by leaking virtual charges of opposite sign. The observed difference between these two infinite charges is finite, and it has the sign of the inner bare charge. That observed finite difference is us 1993).

Note that the infrared (IR), NRAM is a proven heat amplification process where excess energy for the amplification (for the COP > 10 is rarely from the Heaviside energy flow component. It could conceivably be added to the boiler in every steam-turbine-driven generating station. With an achieved amplification of only, say, 40, the process could dramatically reduce (to 25%) of its present fuel requirement) the system’s consumption of hydrocarbon fuel, nuclear fuel rods, etc. while maintaining the same heated steam output, and in doing maintaining the same power output of the generating system. The excess energy input diverted from the neglected Heaviside energy flow environment could come from the additional curvilinear invalidating the vector algebra assumption in (flat spacetime) that the divergence of the curl is zero. In sufficiently curved spacetime that assumption need not be true. Hence in NRAM system there is no usual nonviable huge Heaviside component (when speaking of divergence by a static interchanging charge) can and does get diverted to become an “extra” free Poising input component. That asymmetrical extra free energy input from NRAM environment may cause a radical change in the system transmission lines and circuits all enforce Lorentz symmetry, thus assuring that we continue to power the company engage in a giant wrestling match inside its own generated forces always lose. To borrow a phrase from Nikola Tesla, the ubiquitous use of this self-crippling circuit is “...one of the most remarkable and inexplicable aberrations of the scientific mind which has ever been recorded in history.” (Tesla, 1939).

By deliberately violating the normal operation of this self-symmetrizing circuit, the system can be forced to violate Lorentz symmetry, hence permitting COP > 1.0. But because of the ubiquitous use of this terriblce, this false mystique has erroneously solidified in the scientific community, that COP > 1 is energy-transfer impossible. Thus all TV electromagnetic circuits cannot be built and that the second law of thermodynamics cannot be violated. To the contrary, there are areas in physics, physics, are already known to violate the second law. These areas are listed in some of the leading thermodynamics texts (Kondapudi and Prigogine, 1998 and 1999, p. 459) and are known and accepted by leading non-equilibrium thermodynamics. One such area is that of strong gradients (in EM circuits and elsewhere).

In addition, every statistical fluctuation in a system initially in equilibrium (in a state of maximum entropy) produces negative entropy and thereby lowers the system entropy from its initial maximum value. Quoting Maxwell: model—and consequently upon our electrical power systems and circuits and our scientists and engineers themselves.

10. That Heaviside’s giant usually nonviable “cursed” component of the energy flow sources (Heaviside, 1935) is of no physical significance and can be discarded, leaving the true freezing power divestiture component.

The discarded and uncounted Heaviside component output from every source is far more than—in magnitude (Heaviside, 1935) than the small Poising circuit component (Poisington, 1884, 1885). Circ. 1892 Lorenz—inaugurate the state of this enormous but usually nonrecording Heaviside flow from every generator and battery—simply disposed of the problem itself. He stated that it had no physical significance since it did nothing (because it did not interact) (Lorentz, 1892).

Before his death, Heaviside had realized that his huge curved component of energy flow had gravitational significance and thus had worked out a complete gravitational theory based on this, and these handwritten papers were found some years after his death, beneath the floor boards of his country cottage where he lived out his final years of his life. The papers have been published (Josephs, 1959) and commended upon very favorably (Lastwate, 1982).

So get rid of Heaviside’s troublesome and huge curved component of the energy flow, Lorentz originated the trick of integrating the energy flow vector around an assumed closed surface surrounding any volume element of interest (Lorentz, 1931, p. 185). This procedure arbitrarily discards (from all accounting) the giant and inescapable Heaviside component that does not usually interact to power the circuit or anything else. But this is not true. No electromagnetic permeation means the tiny divergences to power the circuit. The CEM/EEM model thus ignores the fact that, when the huge Heaviside curved component of the energy flow vector is also considered, every dipole source generates a source charge problem (Benedict, 2000, 2002).

As an example, Jackson uses that physical significance to ignore the extra Heaviside component. He states a true premise and then a false premise, assuming they are in agreement. Quoting: “The Poising vector is arbitrary in the extent that the curl of any vector field can be added to it. Such an added term can, however, have no physical consequences.” (Jackson, 1973, p. 237).

To the contrary, with special measures a little of the huge Heaviside curved energy flow also can be diverted after all, and this diverged component can be collected and used. As an example, in the physics of negative resistance absorption of the medium (NRAM), internal and external spacetime curvature is elicited by self-resonating spinning charged particles of the medium. This results in additional energy diverted and collected by the resonant charges from the long-neglected curved Heaviside energy flow component. Hence some 18 times as much energy emerges from the self-resonant medium, operating in the UV or IR, as was input to the medium in the Poising energy flow component (Bolotin, 1983; Paul and Fischer, 1983, Letתש, 1967, 1968, 1995).

The experimentally proven COP of this NRAM process is therefore COP > 18.

Note that the infrared (IR), NRAM is a proven heat amplification process where excess energy for the amplification (for the COP > 10 is rarely from the Heaviside energy flow component. It could conceivably be added to the boiler in every steam-turbine-driven generating station. With an achieved amplification of only, say, 40, the process could dramatically reduce (to 25%) of its present fuel requirement) the system’s consumption of hydrocarbon fuel, nuclear fuel rods, etc. while maintaining the same heated steam output, and in doing maintaining the same power output of the generating system. The excess energy input diverted from the neglected Heaviside energy flow environment could come from the additional curvilinear curvature invalidating the vector algebra assumption (in flat spacetime) that the divergence of the curl is zero. In sufficiently curved spacetime that assumption need not be true. Hence in NRAM system there is no usual nonviable huge Heaviside component (when speaking of divergence by a static interchanging charge) can and does get diverted to become an “extra” free Poising input component. That asymmetrical extra free energy input from NRAM environment may cause a radical change in the system transmission lines and circuits all enforce Lorentz symmetry, thus assuring that we continue to power the company engage in a giant wrestling match inside its own generated forces always lose. To borrow a phrase from Nikola Tesla, the ubiquitous use of this self-crippling circuit is “...one of the most remarkable and inexplicable aberrations of the scientific mind which has ever been recorded in history.” (Tesla, 1939).

By deliberately violating the normal operation of this self-symmetrizing circuit, the system can be forced to violate Lorentz symmetry, hence permitting COP > 1.0. But because of the ubiquitous use of this terriblce, this false mystique has erroneously solidified in the scientific community, that COP > 1 is energy-transfer impossible. Thus all TV electromagnetic circuits cannot be built and that the second law of thermodynamics cannot be violated. To the contrary, there are areas in physics, physics, are already known to violate the second law. These areas are listed in some of the leading thermodynamics texts (Kondapudi and Prigogine, 1998 and 1999, p. 459) and are known and accepted by leading non-equilibrium thermodynamics. One such area is that of strong gradients (in EM circuits and elsewhere).

11. That the symmetrical, standard closed circular loop circuit with source of potential, connected as a load while current flows is the only proper use to use. To the contrary, this main circuit enforces symmetrical self-regulating, forcibly preventing COP > 1.0 Maxwell’s system is perpetually a balanced system incapable of output where the current can move from the vacuum and using it to freely power a load. Lorentz symmetry in an electrical circuit forcibly equalizes its back emf and forward emf, and in a magnetic circuit it forcibly equalizes the back B-field and the forward B-field. The main power system transmission lines and circuits all enforce Lorentz symmetry, thus assuring that we continue to power the company engage in a giant wrestling match inside its own generated forces always lose. To borrow a phrase from Nicola Tesla, the ubiquitous use of this self-crippling circuit is “...one of the most remarkable and inexplicable aberrations of the scientific mind which has ever been recorded in history.” (Tesla, 1939).
12. That EM energy is always positive energy, and that the mass of electrical charges is always positive. To the contrary, with its electron lifted out and departed, a persisting Dirac sea hole has negative mass-energy. As a result, each such hole will also produce negative net EM fields and potentials. Currents of such negative mass-energy holes (the so-called “dark matter”) and their resulting negative EM fields (the so-called “dark energy”) can be evoked and explored in actual circuits, as has been shown (Bedini and Bearden, 2004).

But even Dirac, who despised negative energy and devoted much of his effort to trying to get rid of it, did not take the mistaken view that the hole would be observed as a positive—hating it on the assumption that what space occupied by the hole will have lost its excess negative mass-energy and negative charge, and thus has become more positive in charge and with a positive-going increase in positive mass-energy. Of course this positive increase in the local space charge is not a direct observation of the departed hole itself, or of any physical interaction with the hole itself. Neither is the positive-going increase in mass-energy of the vacated space. It is the replacement of a negative mass-energy electron by a combined positive mass-energy electron and negative mass-energy electron (the replacement of the hole by a piece of ordinary vacuum). A certain change in space is thus observed as a positive-going charge change, after the hole has departed that position. But that is most certainly not an observation of the departed hole, and it is not identically the hole.

This mistaken notion of “observation of the hole itself as a position” has been applied in materials since in interacting with a material lattice (as in the observing instrument) the hole almost always first finds an electron and—along with the electron—the two as a couple disappear back into the vacuum as a “piece of the Dirac Sea” (a piece of normal vacuum) without leaves behind an excess net positive charge in the lattice, and that net charge has positive mass-energy and positive energy EM fields. The hole, on the other hand, has negative mass-energy and negative energy EM fields.

So an excess positive charge is not the hole at all, because the hole is already departed elsewhere. Normal electron hopping in a material lattice with an extra positive charge results in the excess positive charge (the lattice position) migrating around as a “lattice position current.” But it has been largely—and erroneously—accepted in solid state physics as “identical” to the hole. To settle the issue, simply evaluate the hole and its fields prior to the hole moving or interacting with anything, so that observation has not occurred.

In this case, remarks by Farmelo are of direct interest. He stated: “Dirac’s idea was that an ‘empty space’ actually contains electrons that obey the negative-energy solutions of the equation. He supposed that the negative-energy states are normally ‘full’, just like the electrons that fill up the low-energy states of a heavy atom according to the Pauli principle. This means that negatively charged electrons can’t make transitions to these negative-energy states, explaining why ordinary electrons don’t continually disappear into space...By 1931 he had changed his mind and come to a much more radical conclusion: ‘A hole, if there was one, would be a new kind of elementary particle, unknown to experimental physics, having the same mass and opposite charge to the electron.’” By the time Dirac came to collect his Nobel prize in physics, towards the end of 1933, he was in the enviable position of the theorist who has been proven right after his collaborator had almost unanimously dismissed his most imaginative work as misguided and even perverse. His hole theory was soon superseded by quantum field theory (which he did much to invent and came to accept) and he was famously only wonder at his ability to use a wrong theory to produce one of the most triumphant predictions of modern science.” (Farmelo, 2012, p. 48).

13. That EM waves in space are transverse, e.g. given propagation along the x-axis, the E-field might be taken as oscillating along the y-axis and the H-field along the z-axis. The assumption of the transverse EM force-field wave in space is false. To explain its falsity, we must explain the field is measured, and the implications. Consider the Druide electron gas (Druide, 1909) in a conductor (as in a simple antenna or in a detecting instrument). The electrons continually hop off an atom, into the electron gas, onto another atom whose electron had gone wandering, etc. All the electrons have spin as well, and so we can roughly compare an electron to a spinning gyro if the analogy is not pushed too far.

When an EM signal moves through space longitudinally along a wire at nearly the speed of light, the electrons do not move (migrate) that way at or at that speed at all. Longitudinal force is indeed developed in the Druide gas electron by the diverged Poynting component. When a longitudinally-forced Druide gas electron tries to move longitudinally down the wire, it is repelled back nearly equally by all those electrons beyond. So viewed as a gyro, the x-axis is essentially constrained (longitudinally). The restrained spinning electron acts as a gyro, and so it precesses (in the case at right angles to the longitudinal disturbing force) in the angular momentum plane. Thus the EM field energy flow. The longitudinally restrained electron precesses laterally across the cross section of the wire, when “pushed” parallel to the wire with a longitudinal force. As the potentialization signal oscillates to and fro transversely, the precessing electrons oscillate to and fro transversely, mostly within the wire’s cross section.

In a conductor where electrode electrons experience longitudinal and transverse fields from the longitudinally oscillating “signal from space” interaction, these electrons spend most of their time moving actually back and forth (transversely) in the wire, due to their lateral gyro-precession reaction to the longitudinal forces. The electrons do slip longitudinally just a wee bit (particularly at the surface of the wire), so they do move down the wire with only a small “drift velocity”—usually a few inches per hour!

In space, the EM wave is a compression and rarefaction of the energy density of vacuum—i.e., of the stress energy of the vacuum. In short, it is a “stressed wave”, and hence longitudinal.

We detect the electron transverse precession movement and direction, so we detect transverse electron gyroprecession waves in the wire. Even for electrons in space away from wires, due to their masses the electrons are relatively very sluggish and inertially-restrained longitudinally, and so they still move transversely and to the left.

The “effect” force field waves in charged matter are transverse electron gyroprecession waves. The “causative” EM waves in space are force-free longitudinal precession waves of oscillating curvature changes in space-time—and thus oscillating changes in the intensity of the virtual particle flux of the vacuum.

The detection of electron precession waves and therefore of EM transverse waves in the conductor, and in space were accomplished and fixed before the electron was even known or discovered. Hence no such thing as the electron, its gyrophoretic precession effect, or the Druide electron gas itself was even suspected. Since transverse waves were detected in the receiving conductor and instrument, everyone thought that the EM waves coming in from space had just been “interrupted” in the wire. Thus it was assumed that the incoming EM waves in space must obviously be transverse force field waves also.

That is precisely how the pioneers of electromodynamics got the totally mistaken notion of the transverse EM wave in space. They believed in the material ether also, so to them there was not a single point in the universe where mass was absent. If there had been a material ether with spinning material particles to process, then those transverse force fields (in the ether) would indeed have existed. No such ether exists, and no such transverse EM waves exist in the matter-free vacuum.

The luminous material ether was experimentally falsified in 1887, more than a century ago (Michelson and Morley, 1887). Not a CEM/E wave was ever changed to rid the CEM/E model of its false assumption of (1) the material ether, (2) force fields in space, (3) transverse EM force field waves in space, etc., and (4) the other falsities we listed and discussed above.

Tesla was very much aware that the EM waves in massless space were longitudinal, not transverse. He was perplexed that electromystics didn’t understand this. Of the transverse wave theory, he stated: “The Hertz wave theory of wireless transmission may be kept up for a while, but I do not hesitate to say that in a short time it will be recognized as one of the most remarkable and inexplicable aberrations of the scientific mind which has ever been recorded in history.” (Tesla, 1909).

As long as our scientific community refuses to correct the terribly flawed CEM/E model, and all our self-cringing electrical power systems continue to be designed and built with that model by our electrical engineers, then the electric power meter will stay on our homes and facilities, the traffic jams will stay on our roads and trains. In our incessant need for ever additional energy, we will continue to pollute the planet and biosphere, destroy species, highly constrain national economies, and increase global warming. The continuing struggle for meeting ever-increasing energy demands will spawn wars of increasing ferocity, polarization of nations, collapses of national economies, great war destruction of cities and populations, and a return to a new “Dark Age” for humanity itself.

SOME IMPLICATIONS

In real Bedini circuits, to temporarily provide Dirac holes a sharp gradient of energy density is successively focused on a small region of space-time with electrons from their holes for a sudden surge of normal positive energy current (often called the Lenz law effect), and—unknown to electrical engineering—with the temporarily remaining holes tinged with negative energy current pulse in the opposite direction. Both currents can be applied simultaneously to charge a battery very quickly, applying the electron current to one terminal in normal charging mode and the negative energy hole current backward across the battery from the other terminal.** The result is an extraordinarily rapid and asymmetric charging of the battery using a COP > 1 process compared to “normal” COP < 1.5 battery charging methods. These new systems granted and pending for circuits using this dual charging effect (Bedini, 2002, 2003, 2004; Bedini and Bearden, 2004).

One again calls attention to the fact that a sharp gradient is one of the areas in nonequilibrium thermodynamics that is already recognized to enable violation of the second law of thermodynamics. Unknown to the thermodynamicists, the sudden lifting of normal electrons from the vacuum by the strong gradient gives a sudden surge of excess positive energy (real electrons with real kinetic energy and positive energy EM fields) and also a sudden surge of extra negative energy (negative energy holes with negative energy EM fields) in the opposite direction. This dual process is the actual mechanism that violates the second law for sharp gradients, because it produces negative entropy. Bedini has it working in controlled and very useful COP > 1.5 circuits (Bedini and Bearden, 2004) and in other systems (Bedini, 2002, 2003, 2004).

This rapid charging will excess energy (simultaneously with both the surge of free electrons and the sum of free holes) enables a COP = 1.0 battery charging operation. In return, with adroit switching and multiple battery sources, it also allows COP > 1.0 operation of a battery-powered circuit or system. Systems can be built whereby the circuit-charge (with free asymmetric regenerating energy) its own batteries while powering its loads, providing a self-powering system. Without violating physics or nonequilibrium thermodynamics, an asymmetric Bedini system can be built to—and can—keep its own batteries charged while they power the system losses and the system loads. In that case, the Bedini system exhibits COP > α, as does a windmill-powered electrical power system and a solar cell electrical power system.

Thus Bedini has developed and utilized some of those permissible asymmetric self-sourcing Maxwellian systems, but not yet sufficiently elaborated. It is strongly stressed that the solar cell array power system specifically proves that CEM/E systems producing COP > 1.0 and COP > α is possible and practical, given usable excess free EM energy input from the environment.

All useful EM field energy and potential energy in an EM circuit is already extracted in usable form from the active vacuum by the charges q. Hence the trick is to understand the total mise of the energy by conventional symmetrical circuits—by freely and asymmetrically utilizing the free “EM energy from the vacuum” more appropriately.
Conventional NESS systems such as windmill-driven power systems, hydroelectric power systems, and solar cell array power systems are asymmetric systems firedly receiving excess energy from their environment by well-known assymetrical energy sources. Thermodynamically they are NESS systems with free conventional energy input sources. Each produces COP = r. They have permissible direct analogs in electrical power systems taking excess energy from the vacuum via asymmetrical regenerating, and if we had the means to make a closed current loop circuit to violate Loschmidt's symmetry (asymmetrical regenerating) and force a broken symmetry (asymmetrical regenerating) system operation.

In the above versions of the pedali asymmetric systems are presently in production for engineering and production by already-licensed producers. Other asymmetrical regenerating electrical power systems are also in engineering development toward full production (e.g., Patrick et al., 2002). Novel new motors are also in development.

**NOVEL MOTOR DEVELOPMENT**

As an example of other developments, IMP Ltd. — a Welsh engineering company based in Neub—announced in April 2005 the development of a revolutionary electric motor and battery charging process (Radoszit, 2005). Patents are pending in the U.K., mainland Europe, U.S.A. and Hong Kong. The motor uses up to seven rotors in different phases, with input pulse (strong gravitational force) from them. The motor produces some 400% more torque than any other comparable motor presently available. The motor is expected to lead to high performance electric cars, and energy production, and to have up to several hundred miles range. Funding has been provided by IP Wales, which is a business support initiative under the Technium® strategy, partly funded by the European Union and the official Welsh Development Agency.

We point out a viable possibility for the IMP motor: With multiple rotors at different phases, and using sharp gradients across them, production of negative entropy and violations of the second law of thermodynamics can be invoked in multiple rotors at multiple phasings. To assemble a legitimate COP > 1.0 system, the proper switching and timing can select, coherently add, and apply the negative entropy outputs of the combinations of the individual rotors at specific times, so that the controlled output has a combination of excess positive energy (and also excess negative energy, usually just shorted out to ground). While this statement does not prove the motor, it explains why the specific approach can in theory be viable for producing COP > 1.0 performance.

**DARK MATTER AND DARK ENERGY**

It also appears that the Dirac hole and negative energy work of Bedlin and the present author may have solved the mystery of dark matter and dark energy. Many strong gravitational processes continually occur in planets, our sun, the stars, etc. and so Dirac holes and hole currents are continually being produced. “Dark matter” is current and charges of them, along with their associated negative EM fields and potentials (dark energy). Since negative mass of the holes and negative energy of their fields gravitationally repel normal matter and are repelled by it, the holes and their negative energy fields migrate toward the outside of the galaxy, exiting into intergalactic space.

an energy flow vector $S$ from that static arrangement is present, is continuous, is maximized, and is ongoing. The energy comprising the ‘static’ EM field is in motion, as given by the simple formula $S = E$. H. What this problem is sometimes noted by scientists, but “what is in motion, and how” has not been resolved because classical electrodynamicists and electrical engineers erroneously assume that both the $E$ of the electric and the $H$ of the permanent magnet are “static” fields, not involving any sort of “energy flow.” That of course is false. It ignores the fact that any EM field is already a set of ongoing EM energy flows (Whittaker, 1903, 1904). Hence both the “static” $E$ and the “static” $H$ are actually ongoing EM energy flows continuously extracted from the active vacuum by the associated source charges (magnetic poles or electrical charges as the case may be) (Beerends, 2000, 2002).

So one can easily build or assemble an EM energy device producing a real, free flow of EM energy from the vacuum, where the device itself has COP >1.0. The COP = $r$ since the operator need input no energy at all to maintain the continuous free EM energy flow once the device is assembled.

Further, the free flow of Positron energy (and—unrecognized by present scientists—a giant free flow of Heaviside curved energy) will continue indefinitely. This example of the continuous production of giant negative entropy completely falsifies the present old world law of thermodynamics, which must be changed and corrected as previously shown. The device is an example of an entropy producing system performing as has been theoretically possible (Evans and Rondoni, 2002). The best that electrical engineering has to offer in explanation is similar to Buchwald’s comment recognizing the problem. Quoting:

“[Positron’s result] implies that a charged capacitor in a constant magnetic field which is not parallel to the electric field is the seat of energy flows even though all macroscopic phenomena static.” (Buchwald, 2002).

In the atoms and molecules of matter present since the creation of the present universe, every such crossed $E \times H$ field combination has been steadily pouring out EM energy freely for some 1.3 x 10^18 years, and the energy flow has not set down or even diminished. We are universally surrounded by charges freely producing negative entropy and our scientists have not even recognized it! Basic EM energy flow is free, universally downworlding the universe. Evoking a continuous free EM energy flow from the child’s play, simply assemble some charge or a dipole, or crossed $E$ and $H$ fields, and the assembly alone and do not permit to be destroyed or scattered. Capture all the energy you wish, but in asymmetric circuits and in symmetric circuits which can destroy their source of free energy transcuded and flowing from the seething vacuum.

With freely flowing EM energy universally available, the unanswered questions thus:

1. Why is not our scientific community funding and unleashing its graduate students and post-doctoral scientists to discover how to extract free EM energy from such a free and continuous EM energy flow, collect the energy in special assymetrical circuits, and dissipate it to freely provide our loads?

2. Why do our scientists and engineers keep their blind and propagating symmetrical circuits—which to blindly self-enforce Lorentz symmetry—use half their collected free EM energy to kill their own source of EM energy flow, and less than half to power the load?

3. Why should we keep paying to crank the shaft of the generator with more dissipated energy than the work produced by the load, just to keep restoring the generator’s source dipolarity that the circuits unnecessarily keep destroying?

4. Why does the scientific community continue to conceal and avoid the source charge problem, the static Positron generator, and other systems continuously producing negative entropy?

5. Why is the scientific community so blinded that it will not recognize the serious self-contradiction of the present second “half-law” of thermodynamics, and correct and extend the old second law accordingly?

6. Why are the National Academy of Sciences, National Academy of Engineering, National Science Foundation, Department of Energy, great national laboratories, and all universities and large power companies still insisting that we must use hydrocarbons, marine fuel rods, giant dams, nuclear power plants, that are “energy sources” that do nothing but provide raw environmental energy (in different form from the EM energy needed) to laboriously make source dipolarities in our electrical power systems? This giant set of consuming front-end processes requires that enormous “dirty” work be continuously done by this totally unnecessary apparatus of energy-form- converting processes, with the result that the electrical system simply dissipate and insist on using half the captured energy in every EM system to destroy the system dipolarity with its free flow of EM energy from the vacuum!! Our scientific, environmental, teaching, and research communities seem adamantly determined to perpetuate how it has always been done, and to gloriously enrich the giant carthels so handily profitizing from doing it in that insane manner.

We shall not clean up our fragile and beautiful environment, provide decent economies to those terribly struggling poor nations and their horribly beset populace, stop the killing of species, and stop the global warming until we completely revise our entire way of obtaining and providing energy for our modern needs.

The answer to the escalating energy crisis is not obtained by disposing of three-quarters of the human population. Before long, the centralized electric power system is going to be laid down, never to work again, by the terrorist apparatus and capabilities already inserted in our nation. Unless decentralized power is radically rethought in abundance, the U.S. will unravel under a catastrophic economic collapse, with subsequent full-bore weapons-of-mass destruction attacks in the asymmetric war’s operations phase that we have entered as of the beginning of 2005.

The answer is not by rewarding and elevating the Professional Skeptic community bottom-feeders who (i) do not even realize that Newton’s first law is the law of perpetual
The magnetic Wankel engine is basically a rail gun (linear magnetic motor) stator consisting of permanent magnets, curved around and almost ending on itself but not quite. The linear motor drives the rotor magnet rather than a projectile. The forward muff region is almost a closed circuit, but with a small gap between the unclosed ends which is the back muff region. Over and across the back muff region there is placed a pole piece in the form of an inverted T, with a coil on the handle of the T wound in such a way that a significant current in that coil will produce a magnetic field that overrides the back muff magnetic field. In the coil one uses a tiny trick current, making it a very thin “backward muff–overriding field.”

The motor first drives the rotor forward (in the forward muff region), accelerating for almost all of its complete rotation, until the rotor magnet starts to enter the small back muff region that—together with the separate forward muff region—completes the Lorenz symmetry of the system. In this separate back muff region everything gained in the forward muff region will be paid back, unless something is done to cancel that back muff at least momentarily. This is done, in the arrangement and functions shown.

The little trick current is abruptly broken, sharply evoking the Lenz law effect. Momentarily there is a large free surge of excess electron current in that T-coil, causing the same way the little trick current was going. This surge of electron current produces a sufficient, sudden magnetic field to momentarily override the back muff field in its region—just long enough for the rotor magnet to pass on through with no net back muff encountered. This externally input extra opposite field gives the normally asymmetric back muff region a matching “equal and opposite asymmetric partner” momentarily—converting the region to a null region having neither forward muff nor back muff. So that the non-symmetrical generating stress energy with net zero force field resultant in the normally “backward muff–overriding field” can now work on the rotor. This previous asymmetry from asymmetrically experiencing the “back muff” region—which would be required for a back muff that could do any work to reduce the rotor’s momentum.

As this momentary “back muff canceling” field then decays away and the asymmetry of the back muff region rises again, the rotor magnet is already through the back muff region and again in the forward muff region. It thus continues its asymmetric acceleration unchecked by countering back muff action.

So a properly matched load connected to the shaft will be powered continuously and smoothly. For a tiny investment in trick current and sharp switch, the output can greatly exceed the operator’s energy input, since very large energy inputs are freely received from the active environment. Negatively exponential negative engine engineering is both possible and feasible in real systems, replacing the positive entropy engineering exhibited in all our universities and in the scientific and technological community.

We strongly accent that only the control and switching energy need be initially furnished by the operator, providing COP >> 1.0. Once the system is in operation with a large power and work output ongoing, a tiny bit of the output energy can justly be included. The remaining output can then be coupled positive feedback to furnish the much smaller dissipation of “switching and control” energy. At that point the operator’s input may be switched away, and the system becomes a self-powering NES system with COP > 1.0.

The COP > 1.0 performance is made possible because thermodynamically the system becomes a non-equilibrium steady state (NESS) system, freely receiving almost all its required energy input from the active vacuum. With clamped and regulated positive feedback, it becomes a NESS system freely receiving all its required input from the active vacuum, thereby producing COP = ∞ even though overall efficiency remains less than 100%.

As is known in non-equilibrium thermodynamics, a NESS system is permitted to exhibit five unusual characteristics: (i) it can (i) self-order, (ii) self-oscillate or self-state, (iii) output more useful work than could be done by the energy input by the operator only the required excess input energy is freely received from the environment, (iv) it can power itself and its loads (all the required energy input is freely received from the environment), and (v) exhibit production of negative entropy.

1. **EM energy is actually free, and it occurs in free EM energy flows continuously, pouring from every charge and dipole to the universe.** The energy for these continuing flows is freely extracted from the vacuum by the broken symmetry of opposite charges (of the dipole and the charge and its polarized vacuum ensemble doublet). We do not have to learn how to extract useful EM energy from the vacuum, all EM energy is already freely extracted from the vacuum by the source charges. Instead, all we have to do is learn how to build proper circuits that (i) intercept and collect usable EM energy from these free “vacuum outflows” of energy flow, and that (ii) subsequently dissipate the asymmetrically regauged potential energy to provide free work in the load, without destroying the source dipoarity that is furnishing the free energy flow extracted from the vacuum.

2. **Electrical engineering has not admitted and has not directly used the precursor EM field in place in electrical power system engineering.** Since the precursor EM energy flows are free, then by paying a little for switching and control timing, very strong free energy flows can be directed and assembled to form large precursor energy flow patterns we refer to as precursor engines. These large force-free precursor EM engines can then interact with charged matter to form very large force engines in the charged matter, thus producing substantial power and work and specific dynamic in a physical electrical and electronic community.

**Conclusion**

Strong implications emerge from correcting the errors and fallacies in the CEMEE model. Some of these implications are given:

1. EM energy is actually free, and it occurs in free EM energy flows continuously, pouring from every charge and dipole to the universe. The energy for these continuing flows is freely extracted from the vacuum by the broken symmetry of opposite charges (of the dipole and the charge and its polarized vacuum ensemble doublet). We do not have to learn how to extract useful EM energy from the vacuum, all EM energy is already freely extracted from the vacuum by the source charges. Instead, all we have to do is learn how to build proper circuits that (i) intercept and collect usable EM energy from these free “vacuum outflows” of energy flow, and that (ii) subsequently dissipate the asymmetrically regauged potential energy to provide free work in the load, without destroying the source dipoarity that is furnishing the free energy flow extracted from the vacuum.

2. Electrical engineering has not admitted and has not directly used the precursor EM field in place in electrical power system engineering. Since the precursor EM energy flows are free, then by paying a little for switching and control timing, very strong free energy flows can be directed and assembled to form large.
collection is work-free, since no current flowed and hence no power or work was done (i.e., the receiving circuit did not dissipate any of the free asymmetric regening energy).

4. The change continually absorbs disordered virtual photons from the vacuum, converting each to a differential of mass-energy of the charge. Since the mass of a fundamental charged particle is already entangled, the partial absorbtions of disordered virtual photons are thus "rounded" (a negative entropy operation) as coherent changes in unitary mass. They result in a serial string of coherent, additive differentials of mass-energy and increasing virtual acclerating of the axeration charge. While coherent integration of ordered differentials of mass-energy reaches the next quantum level, due to zitterbewegung the excitation abruptly dephases by emission of an observable photon. Iteration of the process results in the charge acting as a Feynman ratchet to inject up reordered virtual energy into continually emitted observable EM. Hence the charge does indeed obey the small conservation of energy law, while producing continuous negative entropy and violating the second law by continually emitting observable EM energy with only a nonobservable energy input.

5. The present second law may be stated as $S \geq 0$, or as $(S + \nu \Delta S) \geq 0$, so that entropy can only remain the same or increase in ongoing successive interactions. To examine this statement, we note that any equilibrium system is in a state of maximum entropy. To produce matter after once being in equilibrium, the system must first be "potentialized" or "excited" to move it away from equilibrium, adding potential energy (asymmetrical regenerating) and lowering the system's entropy—in violation of the present second law. That action is properly written as the interaction $(\nu \Delta S > 0)$, the negative entropy operation, completely contradicting the present second law, but just ignored. The second law actually assumes that such a negative entropy operation has previously happened but is not accounted for.

In short, the present "half-law" merely records the entropy decay of a disequilibrium previously-excited state, back to zero excitation (back to equilibrium). It grossly fails to account for the previous excitation (negative entropy operation) it assumes. The old second law is thus an even more implicitly assuming that its own contradiction has previously occurred but been ignored.

The present author formulated a correction to the second law that holds in all cases, including all the presently known exceptions to the present law. The new law is the law of positive and negative entropy, and it is simply $(\nu \Delta S > 0)$. In other words, the expanded second law now includes positive, negative, and zero entropy processes and in any order. In a great many systems, the excitation and decay operations do occur separately and in serial order, so that in those cases the new second law becomes $(\nu \Delta S > 0)$. In the other cases, the interaction $(\nu \Delta S > 0)$ is zero.

In that form, the old half-law on the right side of equation [1] can clearly be seen as the rightmost term, and it is a special case for a system previously excited by a negative entropy operation as provided in the new leftmost term. For a system in statistical equilibrium, a transient fluctuation initially is that radiated away when equilibrium via the leftmost term, and subsequently returns the system to equilibrium via the rightmost term. So transient fluctuation and fluctuation theorems (Evans and Searles, 1994) are also included, as are systems producing continuous negative energy (Evans and Rondoni, 2002). In the latter case, the rightmost term of equation [1] is simply zero.

REFERENCES


And yet another starting change emerges. A change of geometry from Klein geometry to Leighton geometry is also required. The old Klein geometry (Klein, 1872) has driven much of physics for more than 100 years. Klein's Erlanger program describes geometric structures in terms of their automorphism groups. In Klein's geometry and more limited group methods, a broken symmetry at a given level loses the symmetry information at that level and reduces the overall group symmetry. Every change in the universe already violates Klein's geometry.

In Leighton's object-oriented geometry (Leighton, 2001) with its more advanced group theoretic methods, a broken symmetry reduces work output, divided by the operator's energy input only, and expressed as a fractional form. As a convenient memory device, one thinks, "operator's coefficient of performance."

3. For example, simply triple the voltage applied to a circuit while the electron current is momentarily restrained so that $\Delta t = 0$. This triples the excursion of the pinned charges $q_t$, so that three times as much potential energy is now collected in the Circuit.

And new or living systems or both. We may refer to a given internal structure and its dynamics as an internal engine, transported by the field or potential or wave being examined. In the West, no investigation has been performed of the impact of internal engines when interacting with composite systems (or with living systems)—which already have EM carriers with internal engines.

8. Combination of a hole and an electron combines (i) a negative mass-energy electron having negative energy EM fields and potentials with a positive mass-energy electron having positive energy EM fields and potentials. The combination of equal positive mass-energy and negative mass-energy gives zero net mass energy. The "disappearing" mass energies are simply converted to stress energy of the vacuum. The combination of equal negative energy EM fields and positive energy EM fields gives zero energy net EM fields, because the field energies have been turned into stress potential energy of the vacuum. Hence no net work is done and this radiation occurs when a hole and an electron "annihilate" each other. The process just produces a piece of ordinary vacuum (a filled Dirac Sea hole).

9. This surge of electron current comes from the electrons lifted from the Dirac Sea by the sharp gradient, and is itself a negative entropy operation. At the same time, there is a surge of Dirac Sea hole current (a negative energy current) in the other direction, but the holes in this current are usually just shorted out by grounding and only the positive energy is accounted.

10. With additional adept circuitry means used to momentanously flow the grounding and direct the negative hole currents to the battery, and by applying this novel current backward from the "normal" charging direction, the battery can also be rapidly charged by the negative energy hole current. This is a Bedini method for COP $= 1.0$ battery-charging performance.