

THE WORLD ENERGY CRISIS IN PERSPECTIVE: THE BREAKTHROUGH TECHNOLOGY THAT SOLVES IT QUICKLY

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INTRODUCTION:

The seriousness of the world energy crisis demands the development of a *breakthrough new technology* to solve it -- and simultaneously to dramatically clean up the biospheric pollution presently ongoing by most of our present rather "dirty" energy sources and applications. The necessary technology is already spelled out and waiting; it just needs doing with a determined scientific effort, well-staffed and well-funded. But it is a PHYSICS problem, not an "electrical engineering" problem. Indeed, the first prerequisite is to recognize the deliberate curtailment of the EE model that has *brought on and produced this crisis*. We spell it out in this short synopsis paper.

We wish great success to anyone tackling this urgent problem, and we do salute all serious efforts toward solving it, so long as they are properly oriented on PHYSICS and not just still bound and shackled by the highly crippled electrical engineering. *Tackling the problem from the standard EE approach guarantees failure from the outset! Tackling it from the known modern physics level guarantees success from the outset!*

Our purpose is to inform the reader of some of the major barriers one faces in achieving the breakthrough technology, because of the present horribly mutilated and crippled state of the old electrical engineering (EE) model (from the 1880s. The EE (Heaviside-Lorentz) model was deliberately maimed and mutilated in 1892 by Lorentz's further modification of Heaviside's vector equations to deliberately symmetrize them. *The continued use and universal acceptance of this archaic and severely restricted EE model is the unsuspected reason for the world energy crisis and much of the atmospheric pollution by fueling our present energy sources.*

Because of this unrecognized crippled state of our present electrical engineering (and thus of our present *electric power* engineering), the usual "new energy" announcement or effort is a sad joke, as is most of the present world's scientific policy on "solving" energy-related matters. As a certified example, our own Department of Energy already has operating COP = 200% to 700% experimental solar cells (see Klimov et al.) that produce a *freely amplified* electron output current, using excess EM energy input extracted directly from the local seething virtual state vacuum. This work has been widely published in leading physics and nanocrystalline journals, and it has been experimentally demonstrated and proven by two great U. S. National Laboratories. Thus *it has been*

solidly proven scientifically, forever. More on that later, including rigorous scientific references.

Several outstanding inventors (particularly such as John Bedini) also have patented energy and power systems (demonstration models) that prove the NEW PHYSICS approach to electrical power, and totally validate its ability to solve the crisis. However, for almost a century these inventors have been harassed, denied funding, denigrated, and some have even been killed. The standard objection -- that free EM energy systems are impossible -- is based on the wide assumption that the sad old 1892 EE model is "perfect", and that it already covers everything that can be known about electrical power. This is particularly ironic since adherence to the present grossly inadequate EE model and practice is directly responsible for the world energy crisis in the first place!

In this informal summary, we will review what happened to develop electrical engineering itself, and where and how it went wrong.

The present electrical engineering (and hence electric power) model was kluged together decades before the advent of modern physics such as special and general relativity, quantum mechanics, quantum field theory, gauge field theory, etc. and indeed mostly before the discovery of the electron. In this paper we present some little-recognized facts regarding electric power and EM energy. These facts are outside the present archaic electrical engineering model and symmetrized technology, so they require that a physicist (and preferably one who knows group theory and modern quantum physics) look at them, not an electrical engineer whose curriculum does not include group theory and whose model specifically excludes the exact Maxwellian energy systems that are required to solve the problem.

1. NIKOLA TESLA HAD ALREADY DISCOVERED FREE ENERGY CIRCUITS BEFORE ELECTRICAL ENGINEERING WAS EVEN BORN.

FIRST A LITTLE HISTORY:

Maxwell died in 1879, and very promptly persons such as Gibbs and Heaviside jumped in and tore apart the hated quaternions, producing the far more limited vectors and vector algebra itself. Tesla of course gave the world successful AC power, which could be transmitted over mainlines for large distances, making it practical. But electrical engineering was not yet born; instead, there were some three dozen or so PHYSICISTS worldwide who also knew something of Maxwell's quaternion-like EM theory and model. As AC power began, it became obvious that a new kind of engineer was needed -- one who was trained on the new electromagnetic systems and who could perform the necessary work in designing, emplacing, and maintaining these new power systems. Thus arose the need for electrical engineering, leading to its deliberate formation and being introduced into our universities.

In the early 1890s, the model to be used by the new "electrical engineering" was being put together/determined by H. A. Lorentz, and initially he had tentatively selected the

simplified vector Heaviside model as the model to be utilized. We specifically note that the **original** Heaviside vector theory is still ASYMMETRIC, even though simplified -- and thus it still contains EM systems which can freely output more energy in their forward EMF/MMF region to power their loads usefully, than they output into their back EMF/MMF region to unwittingly destroy the free flow of energy (from the vacuum) in the system itself. In short, Heaviside's original model still includes Maxwellian systems that can output more energy in usefully powering the load than the operator has to input and pay for. As we shall see, the operator does not furnish the energy to power the loads and losses, but only to continually restore the source dipole inside the generator.

We further point out that a SYMMETRIC system, to which present EE is restricted, does not contain these asymmetric Maxwellian COP>1.0 systems that Heaviside's original equations/model still contained.

In 1892, the Heaviside vector electrical engineering (EE) mathematics model was deliberately mutilated and horribly crippled by Lorentz -- by his deliberately altering the equations to symmetrize them -- just before the birth of EE itself in our universities. **We strongly stress:** It is indeed possible to build asymmetric Maxwellian/Heaviside EM circuits and systems that by definition can receive and use extra EM energy freely from the active medium (the active vacuum). As a simplest possible example, every charge and dipole is already such a "free energy system" freely absorbing energy from the virtual state vacuum and radiating it continuously as real, observable EM energy. Shortly we will cite the rigorous proof.

But first to put the history into perspective:

The early physicist Nikola Tesla gave us AC power, the rotating magnetic field that made modern AC motors and generators possible, and radio. Contrary to what is taught in most of our texts, Marconi did not invent radio; instead, he stole it from Tesla's previous work. Sir John Ambrose Fleming, noted English scientist who studied electricity and magnetism under Maxwell and who was also an electrical advisor of the Edison Electric Light Company of London from 1881 to 1891 or so, was also an advisor to the Marconi Company from 1899. In 1901, e.g., Fleming was also advising Marconi in trying to bypass Tesla's actual patents and prior art. [See Sungook Hong, Wireless: From Marconi's Black-Box to the Audion, MIT Press, 2001, p. 72. "In his letter to Marconi on February 19, 1901, Fleming reassured him by saying that Tesla could not do anything, and that 'if you can receive there [in America], you will establish priority'". Marconi followed this advice and obtained patents. When Marconi later tried to bring lawsuit against the US Army Signal Corp and claim that their use of radio violated Marconi's patent rights, Marconi lost the suit. Tesla had already demonstrated priority of art, and this was specifically upheld by the U.S. Supreme Court in 1943, shortly after Tesla's death.

Further, in the late 1880s and early 1890s, the amazing Tesla had already discovered self-powering "free energy from the vacuum" electrical systems and circuits (Tesla's term for the vacuum was "the active medium"). Accordingly, Tesla was already briefing leading technical groups -- such as the American Institute of Electrical Engineers -- that humanity

could *freely* obtain all the EM energy it wished and needed, freely and directly from the active medium itself, without the consumption of any fuel at all. Here are some direct quotes from Tesla:

"Ere many generations pass, our machinery will be driven by a power obtainable at any point in the universe. This idea is not novel... We find it in the delightful myth of Antheus, who derives power from the earth; we find it among the subtle speculations of one of your splendid mathematicians...Throughout space there is energy. Is this energy static or kinetic? If static our hopes are in vain; if kinetic – and this we know it is, for certain – then it is a mere question of time when men will succeed in attaching their machinery to the very wheelwork of nature." [Nikola Tesla, in a speech in New York to the American Institute of Electrical Engineers, 1891. Quoted from back cover of his biography, Margaret Cheney, Tesla: Man Out of Time, Simon and Schuster, 2001]. [Note particularly that the very next year, 1892, Lorentz was elicited by J. P. Morgan's scientists to deliberately alter the still-asymmetric Heaviside equations so that the new Heaviside-Lorentz model was symmetric -- which meant that all such "Tesla overunity systems" were deliberately omitted from the new electrical engineering just being born.]

"Electric power is everywhere present in unlimited quantities and can drive the world's machinery without the need of coal, oil, gas, or any other of the common fuels." [Nikola Tesla].

"We have to evolve means for obtaining energy from stores which are forever inexhaustible, to perfect methods which do not imply consumption and waste of any material whatever. I now feel sure that the realization of that idea is not far off. ...the possibilities of the development I refer to, namely, that of the operation of engines on any point of the earth by the energy of the medium..." [Nikola Tesla, during an address in 1897 commemorating his installation of generators at Niagara Falls.].

"Whatever our resources of primary energy may be in the future, we must, to be rational, obtain it without consumption of any material." [Nikola Tesla, 1900].

For the rigorous mathematical proof that some of Tesla's actual patented circuits could already do this, see T. W. Barrett, "Tesla's Nonlinear Oscillator-Shuttle-Circuit (OSC) Theory," Annales de la Fondation Louis de Broglie, 16(1), 1991, p. 23-41. Barrett shows that EM expressed in quaternions allows shuttling and storage of potentials in circuits (i.e. *selective potentialization*), and also allows additional EM functioning of a circuit that a conventional EM analysis cannot reveal. He shows that the analyzed patented Tesla circuits did exactly this. So Tesla had indeed discovered and was working with *asymmetric* higher-group-symmetry EM circuits, and he could indeed have given the world free EM energy from the "active medium" vacuum, just as he stated.

We also point out that Barrett is a renowned electrodynamicist and one of the noted co-founders and pioneers of ultrawideband (UWB) radar, along with Harmuth. Ironically, the entire U.S. scientific community railed against UWB radar and its pioneers, swearing that it was impossible and against the laws of nature. Ironically, at the very time the conventional scientific community was so harshly and ignobly rebuking and castigating brilliant and pioneering scientists such as Barrett and Harmuth, special concrete-pouring

projects were already using a very small little UWB radar system, to detect voids in deeply poured concrete! Even *after the advent* of UWB radar, agencies such as the U.S. Naval Ordnance Laboratory (NOL) and U.S. Naval Research Laboratory (NRL) were still waxing eloquent that it was impossible and even fraudulent. As late as the 1970s Bearden personally experienced this idiocy by NOL and NRL Ph.D. representatives in a special week-long summary course taken from a private instructor in Washington D.C. In that non-government course, these "representatives" actively interrupted and condemned the instructor until they were faced with forcible physical eviction from the class by Bearden (an experienced third Dan in Yoseikan Aikido and retired Lieutenant Colonel)!

2. DESTRUCTION OF TESLA AND TOSSING OUT ASYMMETRICAL EM SYSTEMS. To prevent Tesla from giving "free EM energy from the active medium" to the world, in 1892 the ruthless J. P. Morgan had already set up the paralysis and near-destruction of Tesla himself, since Tesla's far more practical AC electric power had displaced Morgan's backing of Edison's DC power aim. Morgan also had his scientists elicit Lorentz to deliberately shackle and modify (i.e., to deliberately *symmetrize*) the originally asymmetric vector equations of Heaviside, which were being considered as the basis for the new "electrical engineering" discipline to be set up and taught at our universities. *The original Heaviside equations were still asymmetrical, and thus the original Heaviside model included asymmetric COP>1.0 Maxwellian systems as well as the present far more limited symmetrical systems of electrical engineering.* In short, had the original Heaviside equations been adopted without change, the EE model would have been asymmetrical, and eventually our EEs would have developed at least some *asymmetrical* EM electrical power sources, thus freeing the world from dependence on fuel, wind, water currents, solar radiation, etc.

In short, had not something been done to limit the Heaviside model, the resulting electrical engineering placed in our universities still would have contained those "confounded Tesla systems that could freely take the energy from the active medium without consumption of fuel etc. by the operator."

At Morgan's bidding, Lorentz "borrowed" (in common terms, *stole*) some work of Ludwig Lorentz and used it to deliberately alter and *symmetrize* Heaviside's original equations, thus tossing out all COP>1.0 EM "energy from the active medium" Tesla systems from the resulting crippled and corrupted Heaviside-Lorentz model. If necessary, the reader should have a physicist or group symmetry specialist explain to him or her the *difference* between a symmetrical EE model (set of equations) and an *asymmetrical* set, and also the difference between them with respect to one's ability to build COP>1.0 electrical power systems that burn little or no fuel and take almost all their input energy directly from the local active virtual state vacuum.

The *symmetrical* set of resulting Heaviside-Lorentz equations prescribes and designs and builds -- and *self-enforces* -- only EM systems having COP<1.0. They specifically eliminate all Maxwellian systems that are asymmetrical and thus permitted to directly exhibit COP>1.0. With this change, Morgan deliberately had the world's future electric

power systems limited to only those requiring great external energy input from the environment (wind, water, tides, etc.) or from the consumption of fuel.

The rigorous technical proof that Tesla already had $COP > 1.0$ asymmetric systems, and that he could have done exactly what he said, has already been referenced by citing Barrett's rigorous quaternion electrodynamics examination of Tesla's actual patented circuits.

For an eye-opening view of Lorentz's willingness to publish other scientists' work as his own and take credit for it, see J. D. Jackson and L. B. Okun, "Historical roots of gauge invariance," Reviews of Modern Physics, Vol. 73, July 2001, p. 663-680. Jackson and Okun discuss roots and history of gauge invariance, verify that Ludwig Lorenz (*without* the "t") first symmetrically regauged Maxwell's equations, although it has been misattributed to H. A. Lorentz (*with* the "t") as being first. This is an excellent coverage of the history of who did what and when, and who got credit for it. See also J. D. Jackson, "Examples of the zeroth theorem of the history of science." Am. J. Phys. Vol. 76, No. 8, Aug. 2008, pp. 704-719. In science a discovery named after someone often did not originate with that person. Jackson gives five major examples.

3. EVEN THE FUNDAMENTAL CONSTITUENTS OF THE ELECTRICAL ENGINEERING MODEL ARE STILL NOT REALLY UNDERSTOOD! As pointed out, in 1892 electrical engineering was horribly constrained from its very birth, *and very deliberately*. Modern physics was not even born yet! Literally, the solution to the world's present energy crisis was just arbitrarily discarded from the Heaviside theory! EEs are still not taught group theory in their typical EE curriculum for the Ph.D., and so *they simply do not recognize what was done to them and to the EE model just before the birth of EE itself*.

Quoting Cornille:

"James Clerk Maxwell originally enunciated his theory in 1864 in a memoir entitled 'A dynamical theory of the electromagnetic field'. ...However, it was Oliver Heaviside who first expressed them in the form that we know today in the Philosophical Magazine, February 1888. The striking proof of the importance of Maxwell's theory was given by Heinrich Rudolf Hertz in 1888 when he actually produced electromagnetic waves and effectively measured their speed of propagation, which came out equal to light speed in vacuum. This directly confirmed Maxwell's hypothesis concerning the existence of electromagnetic waves." [Patrick Cornille, "Inhomogeneous waves and Maxwell's equations," Essays on the formal Aspects of Electromagnetic Theory, Ed. A. Lakhtakia, World Scientific, 1993, p. 138.]

For insight into the history of how Heaviside's electromagnetics developed, see:

(a) Oliver Heaviside, "Electromagnetic Induction and Its Propagation," The Electrician, 1885, 1886, 1887, and later. A series of 47 sections, published section by section in numerous issues of The Electrician during 1885, 1886, and 1887. Here

Heaviside published less prestigiously (the publication is roughly equivalent to Scientific American today).

(b) Oliver Heaviside, "On the Forces, Stresses, and Fluxes of Energy in the Electromagnetic Field," Phil. Trans. Roy. Soc. London, 183A, 1893, p. 423-480. Here Heaviside finally published prestigiously. He discusses the Faraday-Maxwell ether medium, outlines his vector algebra for analysis of vectors without quaternions, discusses magnetism, gives the EM equations in a moving medium, and gives the EM flux of energy in a stationary medium. On p. 443, he credits Poynting with being first to discover the formula for energy flow, with Heaviside himself independently discovering and interpreting this flow a little later by himself in an extended form.

For insight into how many of Heaviside's misunderstandings and misinterpretations, we quote Heaviside himself:

"...the question of the propagation of, not merely the electrical potential f but the vector potential \mathbf{A} ... when brought forward, proves to be one of a metaphysical nature ... the electric force \mathbf{E} and the magnetic force \mathbf{H} ... actually represent the state of the medium everywhere... Granting this, it is perfectly obvious that in any case of propagation, since it is the physical state that is propagated, it is \mathbf{E} and \mathbf{H} that are propagated." [Oliver Heaviside, Phil. Mag., Jan. 1889, p. 30.]. Our comment is that this conclusion by Heaviside is absolutely wrong, as is well-known in modern physics but not in electrical engineering. For one thing, Heaviside directly assumed the material ether. Today we know there are no force fields \mathbf{E} and \mathbf{H} in space, but only in charged matter. The reason is very simple: Force \mathbf{F} is defined as $\mathbf{F} = d/dt(m\mathbf{v})$. Simply place $m = 0$ in the equation, and then this results in $\mathbf{F} = 0$ also. Mass is a *component* of force, and force is the ongoing interaction of the force-free medium field or potential with available mass. Hence no observable force exists in mass-free spacetime, where the ongoing interaction is not occurring because there is no observable mass there to interact.

Indeed, deep physics analysis leads one to the fact that Maxwell's EM theory leads to the fact that the "EM fields" may be expressed as curvatures of spacetime. In short, the mechanical notion disappears. E.g., quoting Wheeler and Tilson:

"...the full content of Maxwell's equations for the electromagnetic field can be expressed in terms of statements about the curvature of space — and the derivatives of that curvature — and nothing more. If we summarize the earliest achievement of relativity as gravitation without gravitation, then we can count this analysis as giving us 'electromagnetism without electromagnetism,' and can turn to ... 'charge without charge'." [John A. Wheeler and Seymour Tilson, "The Dynamics of Space-Time," International Science and Technology, Dec. 1963, p. 70.].

Maxwell's actual theory is published as James Clerk Maxwell, "A Dynamical Theory of the Electromagnetic Field," Royal Society Transactions, Vol. CLV, 1865, p. 459. Read Dec. 8, 1864. Also in The Scientific Papers of James Clerk Maxwell, 2 vols. bound as one, edited by W. D. Niven, Dover, New York, 1952, Vol. 1, pp. 526-597. Two errata are given on the unnumbered page prior to page 1 of Vol. 1. In this paper Maxwell presents his seminal theory of electromagnetism, containing 20 equations in 20 unknowns. His general equations of the electromagnetic field are given in Part III, General Equations of

the Electromagnetic Field, p. 554-564 of his Scientific Papers. On p. 561, he lists his 20 variables. On p. 562, he summarizes the different subjects of the 20 equations, being three equations each for magnetic force, electric currents, electromotive force, electric elasticity, electric resistance, total currents; and one equation each for free electricity and continuity. In the paper, Maxwell adopts the approach of first arriving at the laws of induction and then deducing the mechanical attractions and repulsions.

Also, today most EE's are erroneously taught that they have studied "Maxwell's theory", since common practice is to mistakenly call the restricted "Heaviside-Lorentz equations" Maxwell's theory. This of course is a blatant untruth -- or in common terms, it is a blatant and deliberate lie! Maxwell's actual equations are 20 quaternion-like equations in 20 unknowns, not the 4 simple symmetrized vector equations of the Heaviside-Lorentz model used by the EEs. The arbitrarily-discarded asymmetrical systems in Maxwell's actual theory -- and even in Heaviside's original vector theory -- can do a great number of things that cannot even be "seen" in the silly Heaviside-Lorentz model EE equations, as rigorously shown by Barrett. And that includes designing and developing COP>1.0 systems that freely take excess EM energy from the active medium (vacuum) and use it to help power loads, thus achieving COP>1.0 (greater energy output than the energy input paid for by the operator). The Klimov work, validated by two great national laboratories, have now rigorously proven that beyond any further scientific question. More on that shortly. We also point out to the reader that, given a good COP>1.0 system, the system can be converted to "self-powering" by simply adding the proper clamped positive feedback, taking a bit of the output energy as its automatic "control and switching" energy input (the operator's energy input).

In passing, we strongly accent the fact that the deepest insight into physical nature via equations is given by group symmetry, as is well known in physics today. Quoting the noted scientist Steven Weinberg: *"It is increasingly clear that the symmetry group of nature is the deepest thing that we understand about nature today."* [R. P. Feynman and S. Weinberg, Elementary Particles and the Laws of Physics, Cambridge University Press, Cambridge, 1999, p. 73].

4. ADDITIONAL FUNDAMENTAL CONCEPTS ARE ALSO NOT ACTUALLY UNDERSTOOD. EEs are taught that force fields exist in active mass-free space/vacuum. Again, for 50 years that has been known to be a lie. A force field has mass as a component, by the simple little equation $F = d/dt(mv)$. Simply put in "m = 0" in that equation, as it is in massless free space, and immediately F goes to zero also. A force field is the interaction field ongoing with some interacting mass, due to the ongoing interaction of the massless field in space with that mass. In the case of an electromagnetic force field, it is the ongoing-interaction between charged mass and the force-free field in space.

To show that classical electrodynamicists still continue to ignore this basic definition of force, but struggle with it, we quote the eminent classical electrodynamicist Jackson: *"Most classical electrodynamicists continue to adhere to the notion that the EM force*

field exists as such in the vacuum, but do admit that physically measurable quantities such as force somehow involve the product of charge and field." [J. D. Jackson, Classical Electrodynamics, Second Edition, Wiley, 1975, p. 249].

To show that even many physicists still have trouble with any fundamental definition of "force", we quote Nobelist Feynman who struggled to at least shed very significant light on the problem. Quoting Feynman:

"...in 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..." [Richard P. Feynman, Robert B. Leighton, and Matthew Sands, The Feynman Lectures on Physics, Addison-Wesley, Reading, MA, Vol. 1, 1964, p. 12-2].

"...the 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. This potentiality for producing a force is called an electric field." [Richard P. Feynman, Robert B. Leighton, and Matthew Sands, The Feynman Lectures on Physics, Addison-Wesley, Reading, MA, Vol. 1, 1964, p. 2-4].

"We may think of $E(x, y, z, t)$ and $B(x, y, z, t)$ as giving the forces that would be experienced at the time t by a charge located at (x, y, z) , with the condition that placing the charge there did not disturb the positions or motion of all the other charges responsible for the fields." [ibid, vol. II, p. 1-3.]

"One of the most important characteristics of force is that it has a material origin, and this is not just a definition. ... If you insist upon a precise definition of force, you will never get it!" [Richard P. Feynman, Robert B. Leighton, and Matthew Sands, The Feynman Lectures on Physics, Addison-Wesley, Reading, MA, Vol. 1, 1964, p. 12-2].

Even the fundamental concept of "charge" is still little understood. Quoting Silverman:

"The theory of quantum electrodynamics provides a comprehensive and (as far as experiment has been able to confirm) correct description of the interaction of charged matter with electromagnetic fields. And yet, curiously enough, we do not know exactly what charge is, only what it does. Or, equally significantly, what it does not do." [M. P. Silverman, And Yet It Moves: Strange Systems and Subtle Questions in Physics, Cambridge University Press, Cambridge, 1993. p. 127].

We also point out that a similar foundations problem exists with the very notion of "energy", even though every engineer mistakenly assumes *a priori* that he understands it. Quoting Nobelist Feynman:

"It is important to realize that in physics today, we have no knowledge of what energy is." [Richard P. Feynman, Robert B. Leighton, and Matthew Sands, The Feynman Lectures on Physics, Addison-Wesley, Reading, MA, Vol. 1, 1964, p. 4-2].

5. THE TRUE SOURCE OF THE EM ENERGY POURING FROM THE GENERATOR TERMINALS OR BATTERY TERMINALS ALSO IS UNKNOWN IN EE. As one indication of the serious misunderstanding of electrical energy and its actual source, we point out that the EE (and specifically the electric power engineer) has not the foggiest notion where the EM energy pouring from the terminals of a generator (and out into space along the external conductors) actually comes from. Contrary to the EE's belief, it *does not* come from the operator's mechanical energy input that that he inputs to rotate the generator shaft!

The Nobel Prize in physics was jointly awarded to Lee and Yang in 1957, "for their penetrating investigation of the so-called parity laws which has led to important discoveries regarding the elementary particles." See also C. S. Wu, E. Ambler, R. W. Hayward, D. D. Hoppes and R. P. Hudson, "Experimental Test of Parity Conservation in Beta Decay," Physical Review, Vol. 105, 1957, p. 1413. This work reports the experimental proof that the weak interaction violates parity (spatial reflection). This was a rather immediate proof of broken symmetry, as predicted by Lee and Yang in 1956-57.

So since Lee and Yang's Nobel Prize work and Nobel Prize awarded in 1957, we have known that any dipole is a *broken symmetry* in the ongoing tremendous energetic virtual particle interactions of the seething modern vacuum (i.e., of "empty" space). As such, we know that the source dipole continually excites by absorbing virtual photons from the virtual state vacuum, and continually de-excites by emitting observable photons. Hence the source dipole is already a totally free, direct converter/generator of real EM energy output freely extracted from the modern seething virtual state vacuum.

Since every charge (considered with its ambient background as one polarity) is also a dipole, then every charge and dipole in the universe is already freely and continuously emitting real EM energy flow, where the energy is directly and freely extracted directly from the vacuum itself. We do not have to discover how to extract usable EM energy from the vacuum! Nature already does it for us universally, and steadily, and unceasingly.

So when we form the source dipole inside the generator or battery or other source, the energy that then pours from the terminals into the external circuit has come directly from the vacuum, taken and produced and output by that internal dipole itself! Note that cranking the shaft of the generator has nothing at all to do with directly producing the energy flow pouring from the generator terminals.

That is totally against the teaching of electrical engineering, which naively and falsely thinks that the mechanical energy that we input to crank the generator shaft is converted into electrical energy, and it is this "converted mechanical energy in the form of electric energy" that pours from the terminals. And that is TOTALLY FALSE!

So to understand it, let us check what happens to the mechanical input energy we introduce to crank the shaft of the generator. As the generator rotates, it changes the input

external mechanical energy into internal rotating magnetic field energy inside the generator, courtesy of Nikola Tesla. Since change of the FORM of some energy is the rigorous definition of work, then the change of the mechanical input energy (input by the operator) to rotating internal magnetic field energy inside the generator constitutes work. And this work changes the form of the input mechanical energy input to the generator shaft -- thus doing work. Note particularly that, after that work is done, one still has the rotating magnetic field energy in the now-rotating generator and available to act on the internal charges inside the generator.

We strongly stress that the "work" done by the input mechanical energy to rotate the shaft of the generator has nothing to do directly with powering the external circuit's loads and losses. It simply changes mechanical energy into rotating magnetic field energy inside the generator.

So then what does this internal rotating magnetic field energy do? It is dissipated (from the entire system) right there inside the generator, against the internal positive and negative charges, forcing the internal opposite charges apart (in opposite directions) and thus producing the internal source dipole. And the rotating magnetic field energy is fully dissipated from the generator, in achieving that result. None of the original rotating magnetic field energy flows out of the terminals in the Poynting energy flow. All that the rotating magnetic energy field energy does is get dissipated inside the generator itself to form the source dipole inside the generator itself.

Well, once formed, what does the source dipole then actually "do"? From Lee and Yang's 1957 epochal Nobel Prize-winning work, this internal source dipole is a proven broken symmetry. For any broken symmetry, in physics we know that "something previously virtual now becomes observable". Two exact quotes from Nobelist Lee are:

"Since nonobservables imply symmetry, any discovery of asymmetry must imply some observable. The experiment of Wu, Ambler, Hayward, Hoppes and Hudson... established the asymmetry between the positive and negative signs of electricity." T. D. Lee, Symmetries, Asymmetries, and the World of Particles, U. Wash. Press, Seattle, 1988, p. 11.

"...the violation of symmetry arises whenever what was thought to be a non-observable turns out to be actually an observable." [T. D. Lee, Particle Physics and Introduction to Field Theory, Harwood Academy Publishers, Chur, New York, and London, 1981, p. 181.]

It is simply seen that when there is no broken symmetry, then what is energetically existing there as the space inside the generator is virtual energy of the vacuum. When there is a broken symmetry, however, what is now being produced therein, and output there-from the nonobservable (virtual) vacuum energy, is real observable EM energy, having become so (from the previously virtual energy) due to the broken symmetry process.

In short, the dipole is a proven, functioning broken symmetry and the long sought UNIVERSAL FREE ENERGY FROM THE VACUUM GENERATOR. Hence it

continually receives (absorbs) virtual state photons from the seething virtual state vacuum, converts and adds its excitation coherently into observable size, and then continually dissipates that continual virtual excitation by continual emission of observable photons. As can be seen, broken symmetry is the process by means of which virtual energy of the ambient virtual state vacuum is freely converted to observable energy.

Every charge and dipole in the universe already is doing this for free! That is, we simply pay a little bit to produce a source dipole, and its broken symmetry continually and freely extracts virtual EM energy from the vacuum, and converts it into observable energy, and continually de-excites its excess excitation by continually emitting real observable photons -- real steady flow of observable photons that constitutes the so-called "static" EM field. The electrostatic scalar potential of a source dipole in EE, is actually a steady EM energy "wind" being emitted from the dipole from its virtual energy absorbed continually from the vacuum.

If we then just "let the created source dipole alone" and do not destroy it, it will freely pour out real energy extracted from the vacuum, and it will continue to do it freely forever!

So every charge and dipole in the universe is already a true and proven free EM energy source, continually and freely pouring out real EM energy extracted directly from the seething active medium itself -- from the active virtual state vacuum itself.

This gives us a wonderful new and universal energy source that is necessary to solve the world energy crisis easily, quickly, cheaply, and permanently: The seething virtual state vacuum will continually provide us with as much observable EM energy as we wish, merely by constructing one or more dipoles and affixing it or them so that they just "stay put" and are not destroyed. Such a "fixed" dipole will simply sit there and freely pour out an unending stream of observable, usable EM energy, and it will do it forever if just left alone and not deliberately destroyed. It will do it anywhere, anytime, for anyone.

To reiterate: After initially paying a tiny bit to make the source dipole, and then just leaving it alone and unmolested, we have easily produced a startling "free" universal energy source, easily tapped by just making a dipole and then "nailing it down" and insuring that the dipole is not then deliberately destroyed. This is a free EM energy "wind" that never stops -- as long as we simply leave the source dipole alone!

Applying this to the functioning of a source dipole inside the generator or other source (such as a battery): The internal source dipole continually absorbs virtual photons from its ongoing seething vacuum interaction, excites itself by coherently adding (integrating) the successively-absorbed EM virtual energy to quantum size, and then continually "decays" its potentialization excitation by steadily emitting real, observable photons of real, observable EM energy. Again quoting Lee, "-- any discovery of asymmetry must imply some observable."

Once it is formed, if we will simply leave the internal source dipole alone and not deliberately destroy it by pumping the back emf current back through it, then it will steadily and freely pour out real, usable EM energy extracted directly from the vacuum by the internal source dipole, until the end of time!

And it is this "observable EM energy" (i.e., this steady stream of observable photons produced by the internal source dipole) that indeed pours from the generator terminals and flows through space along the external conductors.

Thus all EM energy pouring from the generator terminals into every external circuit actually comes from the seething virtual state vacuum via the proven broken symmetry of the generator's internal source dipole, once formed. None of this free outpouring of energy has anything directly to do with the input of mechanical energy to the generator shaft to rotate it. All that the input mechanical energy does, is form the source dipole via the intermediate change of mechanical energy into rotating magnetic field energy.

All EM circuit energy in every circuit actually comes from the modern interacting local virtual particle vacuum, and not from burning fuel or from the wind blowing the blades of a windmill, or water currents turning a hydroturbine which cranks the generator shaft. The normal energy input from wind, water, or burning fuel does nothing but form the source dipole inside the generators, so as to start the generator extracting its output EM energy directly from the seething virtual state vacuum, and outputting it as real EM energy flow through space along the external conductors.

6. WHAT THE SYMMETRIC EE SYSTEM DIABOLICALLY DOES: IT DELIBERATELY AND CONTINUOUSLY DESTROYS THE SOURCE DIPOLE AND SHUTS OFF ITS FLOW OF FREE EM ENERGY RECEIVED FROM THE VACUUM!

The standard artificially symmetrized EE circuit/system built by our EEs uses an inane closed series circuit including the internal source dipole of the generator (the "back EMF" section) and the external circuit and its loads (the "forward EMF" section). This means that half the free "energy from the vacuum" (that the dipole freely diverged into the collecting external circuit conductors) is then deliberately used to pump spent electrons from the ground side of this inane series circuit back through the back EMF section, continually destroying the source dipole and thus cutting off its continual extraction and output of free EM energy from the vacuum via its proven asymmetry. The other half of the collected "free energy from the vacuum" is used/dissipated in the "forward EMF" half of the circuit (i.e., in the external circuit), to power the external loads and losses.

Since all real external circuits have losses, then less than half the available diverged potential energy is dissipated in powering the external loads themselves. Meanwhile, almost the full "other half" of the available diverged potential energy is used to destroy the internal source dipole itself and cut off the free extraction of EM Energy from the seething virtual state vacuum.

Well, using a 100% efficient process, we will still have to add as much energy to restore the source dipole and its free extraction of EM energy from the vacuum, as was used to destroy it. In less than a 100% efficient process (the usual situation), we will have to add more energy in restoring the source dipole than was used to destroy it.

So in a normal inanely-symmetrized standard EE system or circuit, we will always have to input more mechanical energy to crank the generator shaft (i.e., to restore the destroyed dipole) than was used to destroy it. Well, this also means that -- in the standard symmetrical EM system universally designed and built by our electrical engineers -- we ourselves will always have to input and dissipate more energy to restore the source dipole and its free extraction of EM energy from the vacuum, than is dissipated in the external loads of the generator's external circuit to usefully power them.

Coefficient of performance (COP) by definition is the useful energy output divided by the operator's input to the system, usually expressed as a decimal fraction but sometimes as a percentage. So with the EE's horribly mutilated and symmetrized Heaviside-Lorentz model, he can only design, develop, and build and deploy a COP<1.0 system. The symmetrical system itself continually enforces this atrocious condition, because of the system's deliberate symmetrization.

As we hope the reader can see, obviously the answer to the world energy crisis -- i.e., the long sought "great new energy breakthrough" -- is to learn to build asymmetrical EM systems (e.g., those that were arbitrarily discarded from the EE model by Lorentz in 1892) that can freely output more EM energy in powering their loads than the energy that the operator furnishes to restore the internal source dipole.

7. EVERY SOURCE DIPOLE ACTUALLY POURS OUT TRILLIONS OF TIMES MORE ENERGY THAN THE OPERATOR INPUTS TO ROTATE THE GENERATOR SHAFT AND THEREBY CONTINUALLY RESTORE THE SOURCE DIPOLE.

Shortly after 1892 when Morgan elicited Lorentz to deliberately cripple and mutilate the forthcoming EE model so it could never produce COP>1.0 EM systems, to Morgan's absolute astonishment Heaviside discovered a gigantic and mind-boggling extra component of EM energy flowing freely from the generator terminals (and thus freely being extracted by the broken symmetry of the internal source dipole of the generator). This eerie and incredible nondiverged Heaviside energy flow component is something on the order of ten trillion times in magnitude as the magnitude of the normal (accounted) linear Poynting energy flow component that is diverged into the external conductors to "potentialize the electrons in the wire and power up the circuit/system".

Eerily, this giant Heaviside flow component is in curled form, which means that (in any special relativity situation where the frame itself is not rotating) it normally does not diverge into the external conductors to "power up the electrons", since in that normal special relativity situation the divergence of the curl is equal to zero. Hence this giant Heaviside curled EM energy flow usually (almost always!) just roars on off into space, outside the external conductors, and never gets diverged into the circuit but is just wasted!

Quoting Heaviside:

"It [the energy transfer flow] takes place, in the vicinity of the wire, very nearly parallel to it, with a slight slope towards the wire... . Prof. Poynting, on the other hand, holds a different view, representing the transfer as nearly perpendicular to a wire, i.e., with a slight departure from the vertical. This difference of a quadrant can,

I think, only arise from what seems to be a misconception on his part as to the nature of the electric field in the vicinity of a wire supporting electric current. The lines of electric force are nearly perpendicular to the wire. The departure from perpendicularity is usually so small that I have sometimes spoken of them as being perpendicular to it, as they practically are, before I recognized the great physical importance of the slight departure. It causes the convergence of energy into the wire." [Oliver Heaviside, Electrical Papers, Vol. 2, 1887, p. 94].

On hearing of this "tremendous but unused output energy from every source" discovery by Heaviside, Morgan again went into a rage and stated that they simply could not have the new young electrical engineers being taught that every generator/source already outputs more than a trillion times as much EM energy flow output as the relatively feeble mechanical energy input to the generator that the operator provides. As Morgan snapped, if they were to be taught this, then in the future some sharp young devil would figure out how to tap some of that giant curled Heaviside energy flow anyway and use it freely.

So Morgan's minions again elicited the services of Lorentz in 1900 to "fix the problem". As a result, in 1900 Lorentz formulated the totally arbitrary procedure of just first directly integrating the total energy flow vector (including both the nondiverged Heaviside giant curled flow component and the tiny little diverged Poynting linear flow component) around a closed surface assumed around any and every volume element of interest. [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," pp. 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.

Also see H. A. Lorentz, H. A., "La Théorie électromagnétique de Maxwell et son application aux corps mouvants," [The Electromagnetic Theory of Maxwell and its application to moving bodies], Arch. Néerl. Sci., Vol. 25, 1892, pp. 363-552. Also in H. A. Lorentz, Collected Papers, the Hague: Martinus Nijhoff, vol. 2, pp. 168-238, especially p. 168.]

This totally arbitrary "magician's trick" by Lorentz neatly discards the giant nondivergent Heaviside curled flow component from every EM source, while retaining the very tiny divergent Poynting flow component. Lorentz justified this farce by pointing out that the giant nondiverged Heaviside curled flow "could have no physical significance" since it did not diverge and thus did nothing at all because it did not interact with anything!

And the same euphemism that "it can have no physical consequences" is still used to "justify" this arbitrary inane Lorentz integration procedure today. E.g., quoting Jackson, one of the great classical electrodynamicists of our time:

"...the Poynting vector is arbitrary to the extent that the curl of any vector field can be added to it. Such an added term can, however, have no physical consequences. Hence it

is customary to make the specific choice ..." [J. D. Jackson, Classical Electrodynamics, Second Edition, Wiley, 1975, p. 237].

We comment that Lorentz's statement and Jackson's reiteration are true only so long as the situation remains *special-relativistic* (in one fixed frame). Completely unknown to electrical engineering (which always uses special relativity and a fixed frame), Jackson's statement can indeed be violated by a proper *general relativistic situation* being deliberately invoked. In the latter case, it is then possible to diverge a little bit of the normal divergence-free giant curled Heaviside energy flow component. You see, unknown to EE's, the conservation of energy and momentum laws rigidly apply only in a special relativistic situation. If we deliberately involve multiple rotated frames and thus impose a general relativistic condition, then we can deliberately violate these two fundamental laws! This oddity was noted shortly after Einstein's discovery of general relativity, and pointed out by the great mathematician Hilbert. Quoting Hilbert:

"I assert... that for the general theory of relativity, i.e., in the case of general invariance of the Hamiltonian function, energy equations... corresponding to the energy equations in orthogonally invariant theories do not exist at all. I could even take this circumstance as the characteristic feature of the general theory of relativity." [D. Hilbert, Gottingen Nachrichten, Vol. 4, 1917, p. 21.].

Quoting Logunov and Loskutov:

"In formulating the equivalence principle, Einstein actually abandoned the idea of the gravitational field as a Faraday-Maxwell field, and this is reflected in the pseudotensorial characterization of the gravitational field that he introduced. Hilbert was the first to draw attention to the consequences of this. ... Unfortunately, ... Hilbert was evidently not understood by his contemporaries, since neither Einstein himself nor other physicists recognized the fact that in general relativity conservation laws for energy, momentum, and angular momentum are in principle impossible." [A. A. Logunov and Yu. M. Loskutov, "Nonuniqueness of the predictions of the general theory of relativity," Sov. J. Part. Nucl., 18(3), May-June 1987, p. 179].

Quoting Sir Roger Penrose:

"We seem to have lost those most crucial conservation laws of physics, the laws of conservation of energy and momentum!" [Penrose then adds the Killing symmetry arbitrarily, to get conservation again, when the Killing vector applies and gravity is thus separated.]. *"These conservation laws hold only in a spacetime for which there is the appropriate symmetry, given by the Killing vector κ [These considerations] do not really help us in understanding what the fate of the conservation laws will be when gravity itself becomes an active player. We still have not regained our missing conservation laws of energy and momentum, when gravity enters the picture. ... This awkward-seeming fact has, since the early days of general relativity, evoked some of the strongest objections to that theory, and reasons for unease with it, as expressed by numerous physicists over the years. ... in fact Einstein's theory takes account of energy-momentum conservation in a rather sophisticated way – at least in those circumstances where such a conservation law is most needed. ... Whatever energy there is in the gravitational field itself is to be excluded from having any representation..."* [Roger Penrose, The Road to Reality, Alfred A. Knopf, New York, 2005, p. 457-458.]

We remark that, considering the enormous curled Heaviside nondivergent energy flow component, that energy is always of at least gravitational importance. But by deliberately excluding gravitation, electrical engineering ignores all such asymmetrical effects, even when appreciable.

For an example of a general relativistic situation known to optical physicists since 1967, which does indeed violate local conservation of energy and thereby produce COP = 18, see the phenomenon known as "negative resonance of the absorbing medium" (NRAM). [E.g., see V. S. Letokhov, "Generation of light by a scattering medium with negative resonance absorption," *Zh. Eksp. Teor. Fiz.*, Vol. 53, 1967, p. 1442. See also Craig F. Bohren, "How can a particle absorb more than the light incident on it?" *American Journal of Physics*, 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. See also 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. The Bohren experiment is repeatable and produces COP = 18.

However, the optical physicists involved -- in teaching the experiments in optics and having the students perform these COP = 18 experiments in the laboratory -- are rigidly controlled. They are not allowed to say "excess emission" but can only say "negative absorption". They are not allowed to discuss the thermodynamics of the situation, or to use the phrase that "COP = 18". Instead, they are allowed to only say that the process "increases the reaction cross section" of the absorbing self-oscillating charged particles forming the input section.

Without further discussion, we have previously pointed out how this NRAM process can be used (along with some clamped positive feedback) to make the steam boilers self-powering that usually power our generators. This alone will allow tremendous decrease in the number of necessary fuel-burning and nuclear powerplants in the present grids! Once a single boiler is made self-powering, it can furnish the energy necessary to "kick-start" other self-powering steam boilers. In this way, with some modifications, our present giant network of power distribution can be maintained, while most of the present fuel-burning and nuclear power plants are dismantled forever. This allows capitalization on all that tremendous capital investment we have already made in our power system, during the years while we are slowly and economically transitioning to the final "self-powering" local electrical power systems that will be almost universally used eventually. This will greatly reduce the cost of electrical power, while at the same time dramatically reducing the pollution of our biosphere by the residues of fuel-consuming power plants.

8. REAL EM SYSTEMS THAT EXTRACT AND UTILIZE EXCESS ENERGY FROM THE VIRTUAL VACUUM ARE ALREADY KNOWN AND RECOGNIZED IN PHYSICS AND IN NANOCRYSTALLINE SCIENCE-- AND THEY HAVE BEEN RIGOROUSLY PROVEN AND DEMONSTRATED. Finally, total and unequivocal proof of COP>100% EM physical systems has now been rigorously accomplished and validated in two great U.S. national laboratories, where COP>1.0 nanocrystalline solar cell systems have been produced that directly extract additional EM energy from the seething virtual state vacuum and use it. Victor Klimov in Los Alamos National Laboratory in New Mexico has constructed a solar cell which can absorb the light of a specific wave length in such a way, that one input photon can energize more than one electron output. As soon as the solar cell absorbs a photon, its output electron *disappears for a very short moment into the local quantum field*. Being in the virtual state the electron can borrow additional energy from the vacuum, and thereafter it immediately appears again in our reality but now highly excited. Now this *highly excited* electron can decay into 2 to 7 output electrons. This leads to a theoretical maximum coefficient of performance (COP) of from 200% to 700%. A COP = 200% can be readily achieved and it has been done repeatedly. In addition to its performance in the Los Alamos National Laboratory, the experiment has also been replicated successfully by the National Renewable Energy Laboratory in Golden Colorado. [E.g., see Herb Brody, "Solar Power - Seriously Souped Up." *New Scientist*, May 27, 2006, p 45].

Quoting: "*Make solar cells as small as a molecule; and you get more than you bargained for. Could this be the route to limitless clean power?*".

Comment by the present author: Note that the super-excited electron, after emerging from the seething virtual state vacuum immersion, actually then splits into two or more "normal" electrons! So the output current of the solar cell process is *freely* amplified by excess energy from the *local virtual state vacuum*. Note that at about COP = 3.0, one could conceivably add clamped positive feedback of one of those output electrons back to the "dive back into the seething virtual state vacuum" input, replacing the original electron input, and the unit would be "self-powering" (powered by energy from the vacuum) while putting out the other two electrons as output.

Or by using some of the output current in a radiation-producing process, one could have the positive feedback input as a radiation photon, to replace the initial solar input entirely. In this fashion, once "jump started" by some source of solar radiation, the resulting "solar panel" system would become totally self-powering, taking all its input and output energy directly from the seething vacuum itself.

Also particularly note that a tiny crystal of tourmaline has a dipolarity across itself like a small battery. Also, it is an asymmetric EM "circuit", so it will asymmetrically power a small suitable load using the "self-voltage" of its dipolarity, and *it does not destroy its own source dipole when powering its small load*. The tourmaline crystal thus just sits there and continually emits real photons freely. Thus anyone can see that if a spherical shell assembly of Klimov's self-amplifying nanocrystalline solar cells surrounds a tourmaline crystal at the center, then the "solar photons" to initiate the Klimov cells will be continually received by those perimeter cells, and thus one will have a true "self-powering battery" that sits on the bench and continually emits real electrons to power an external circuit and a load. Note that the required asymmetry is furnished by the proven

asymmetry of the tourmaline crystal and the proven asymmetry of the Klimov nanocrystal. Hence one can in theory develop a "self-powering solar panel" that will power itself and its load, whether or not the sun is shining etc.

Additional references on the Klimov effect:

Richard D. Schaller, Vladimir M. Agranovich and Victor I. Klimov; "High-efficiency carrier multiplication through direct photogeneration of multi-excitons via virtual single-exciton states." Nature Physics Vol. 1, 2005, pp. 189-194.

Richard D. Schaller, Melissa A. Petruska, and Victor I. Klimov; "Effect of electronic structure on carrier multiplication efficiency: Comparative study of PbSe and CdSe nanocrystals"; Appl. Phys. Lett. Vol. 87, 2005, 253102.

Richard D. Schaller, Milan Sykora, Jeffrey M. Pietryga, and Victor I. Klimov, "Seven Excitons at a Cost of One: Redefining the Limits for Conversion Efficiency of Photons into Charge Carriers," Nano Lett. Vol. 6, 2006, p. 424.

Victor I. Klimov, "Spectral and Dynamical Properties of Multiexcitons in Semiconductor Nanocrystals," Annual Review of Physical Chemistry, Vol. 58, No. 1, 2007, p. 635.

M. C. Hanna, A. J. Nozik. "Solar conversion efficiency of photovoltaic and photoelectrolysis cells with carrier multiplication absorbers," Journal of Applied Physics, vol. 100, No. 7, 2006, p. 07450.

Sung Jin Kim, Won Jin Kim, Yudhisthira Sahoo, Alexander N. Cartwright, Paras N. Prasad, "Multiple exciton generation and electrical extraction from a PbSe quantum dot photoconductor," Applied Physics Letters, Vol. 92, No. 3, 2008, p. 031107.

Alberto Franceschetti, Yong Zhang, "Multiexciton Absorption and Multiple Exciton Generation in CdSe Quantum Dots," Physical Review Letters, Vol. 100, No. 13, 2008, p. 136805.

G. Allan, C. Delerue, "Role of impact ionization in multiple exciton generation in PbSe nanocrystals," Physical Review B, Vol. 73 (20), 2006, p. 205423.

Hsiang-Yu Chen, Michael K. F. Lo, Guanwen Yang, Harold G. Monbouquette, Yang Yang, "Nanoparticle-assisted high photoconductive gain in composites of polymer and fullerene," Nature Nanotechnology, Vol. 3 (9), 2008, p. 543.

M.C. Beard, R.J. Ellingson, "Multiple exciton generation in semiconductor nanocrystals: Toward efficient solar energy conversion," Laser & Photonics Review, Vol. 2, No. 5, 2008, p. 377.

Quoting: "Now Victor Klimov and colleagues at the Alamos National Laboratory have designed nanocrystals with cores and shells made from different semiconductor materials in such a way that electrons and holes are physically isolated from each other. The scientists said in such engineered nanocrystals, only one exciton per nanocrystal is required for optical amplification. That, they said, opens the door to practical use in laser applications." ["Scientists Create New Type of Nanocrystal," PHYSORG.COM, Nanotechnology, May 24, 2007.

Seo, Hye-won; Tu, Li-wei; Ho, Cheng-ying; Wang, Chang-kong; Lin, Yuan-ting. "Multi-Junction Solar Cell," United States Patent 20080178931, July 31, 2008. A photovoltaic device having multi-junction nanostructures deposited as a multi-layered thin film on a substrate. Preferably, the device is grown as $\text{In}_x\text{Ga}_{1-x}\text{N}$ multi-layered junctions with the gradient x , where x is any value in the range from zero to one. The

nanostructures are preferably 5-500 nanometers and more preferably 10-20 nanometers in diameter. The values of x are selected so that the bandgap of each layer is varied from 0.7 eV to 3.4 eV to match as nearly as possible the solar energy spectrum of 0.4 eV-4 eV.

J. R. Minkel, "Brighter Prospects for Cheap Lasers in Rainbow Colors," Scientific American (website), May 25, 2007.

Quoting Victor Klimov:

"Carrier multiplication actually relies upon very strong interactions between electrons squeezed within the tiny volume of a nanoscale semiconductor particle. That is why it is the particle size, not its composition that mostly determines the efficiency of the effect. In nanosize crystals, strong electron-electron interactions make a high-energy electron unstable. This electron only exists in its so-called 'virtual state' for an instant before rapidly transforming into a more stable state comprising two or more electrons." [Lead project scientist Victor Klimov, quoted in "Nanocrystals May Provide Boost for Solar Cells, Solar Hydrogen Production," Green Car Congress, 4 Oct., 2008.]

9. ONE CAN POWER THE LOAD OR LOADS BY FURNISHING ONLY STATIC VOLTAGE (STATIC POTENTIALIZATION ENERGY) TO THE EXTERNAL CIRCUIT.

Much of the world was electrified by Tesla's demonstration of an electric car using only a relatively small box with some tubes and other components as the electric power source. No electrical engineer has ever understood how it was powered, since they universally and erroneously assume that one must "draw power" (including both voltage and current) from the source. Tesla, on the other hand, understood how to power a car on "static" voltage alone, with zero current furnished by the static voltage source.

So the fact that all EEs are erroneously taught that they must "draw power" from the generator is one of the most notorious and unrecognized technical "lies" of all time! They need do no such thing. They receive ENERGY FLOW from the generator in the form of VOLTAGE. A volt is "energy per collecting/interacting charge". In other words, all one needs do is draw STATIC VOLTAGE from the source, and let it flow over the external circuit *while the external charges are momentarily pinned and unable to move as current*. This will "potentialize" the external circuit (all those coulombs of pinned charges in the conductors) statically, and so the EM ENERGY IS FREELY COLLECTED IN THE EXTERNAL CIRCUIT without any "power" being "drawn" from the source at all. As a consequence, in that process the source is not "depleted" in the slightest, even though enormous potentialization energy can be freely furnished to the interacting static electrons in the external circuit, by the "static voltage" source.

Then while the potentialized electrons in the potentialized external circuit are still "pinned", we *disconnect* the primary source, and by adroit switching we also close the gap in the freed external circuit with a diode and load in series. The diode is specifically

arranged so that, once the electrons in the new closed circuit system become unpinned, the resulting current will circulate around the circuit serially.

So once the now-unpinned SEPARATE external system allows its electrons to flow, we have a normal potentialized dipolar circuit in which power now circulates. Now the SEPARATE, SYMMETRIZED and FREELY POTENTIALIZED new external circuit with its load will dissipate half its freely collected potentialization energy to power the losses and the loads, and it will also dissipate the other half of its freely collected potentialization energy to destroy its own dipolarity.

So it destroys itself as does any normal SYMMETRIC circuit, but since it has been freely potentialized, it gives us some FREE POWER IN THE LOAD in destroying itself by destroying its own dipolarity.

Then by switching again, we remove the "closure" (the series resistor and diode) placed in the external circuit across its input terminals, and we again pin the electrons and reconnect the external static voltage source dipole. Again we potentialize statically by the momentary connecting of the static electric potential source to the again-pinned circuit. Then separate the static voltage source again, recomplete the external circuit again, and dissipate some more freely collected energy in the load. Do it again and again.

And with only a tiny bit of switching energy that you furnish, you can power the powerful loads. One may include the "switching unit" itself as part of the external circuit, so that its static potentialization also furnishes the tiny bit of switching energy it requires.

Specifically, you can take a small battery and easily power a powerful electric car, furnishing only "static voltage" to potentialize the external collection circuit while its electrons are pinned and current cannot flow.

Any battery or "static voltage" source will thus power the external circuit and loads COMPLETELY FREELY, where one needs only pay for a tiny bit of switching. And again, that "switching" energy can itself be taken from the automatic separated external circuit's dissipation and powering of the loads and losses.

This is precisely how Tesla powered his electric car, a Pierce Arrow. And it has not been understood to this day, because the pundits seek to find a standard electrical engineering solution. There is none! The methodology used is OUTSIDE what is permitted in ordinary electrical engineering with its circuits specifically limited to symmetrical systems.

Eerily, any physics (and even electrical engineering) department worth a hoot can readily develop such a system, IF THEY BUT UNDERSTAND THE PROBLEM FROM A PHYSICS STANDPOINT AND ATTACK IT SO THAT ALL THE SO-CALLED "POWER" SOURCE IS EVER REQUIRED TO FURNISH IS STATIC VOLTAGE.

10. IN SUMMARY: WE CAN READILY RESOLVE THE PRESENT WORLD ENERGY CRISIS -- CHEAPLY, QUICKLY, AND CLEANLY -- ONCE WE PROPERLY UNDERSTAND THE PROBLEM AND THAT ITS MAIN CAUSE IS THE DELIBERATE CRIPPLING OF ELECTRICAL ENGINEERING.

So there we have it. The world energy crisis is actually due to the *deliberate and diabolical mutilation and crippling* of the Heaviside EE model by Lorentz in 1892, just before the very birth of EE itself, and its further deliberate crippling in 1900 by Lorentz. The EE model was crippled further in 1900 by Lorentz formulating and teaching the *arbitrary discard of the huge Heaviside giant curled EM energy flow component*, so that electrical engineers would never be aware that every generator and battery already takes all its output energy from the seething vacuum, and actually outputs *trillions* of times as much energy output as the operator's energy input to the system to crank the shaft of the generator.

I strongly urge your country to look into this area in depth, using some *physicists* and not EEs, so that group theory's repercussions can be noted and shown. This is a physics problem, not an electrical engineering problem!

It is indeed possible (and eventually it will be practical) to build real EM systems that freely extract all the EM energy from the local virtual state vacuum that we wish and need. This has been proved forever by the Klimov work and by its tremendous independent replication and validation at two of our leading giant National Laboratories. We therefore never have to "prove" it again.

So I strongly urge your country to look into this symmetry vs. asymmetry area as a top priority of the entire nation today, and of the entire scientific community today. In God's name, please get the crippled old 1880s/1890s EE model replaced by something much better and more modern, from the far more comprehensive higher group symmetry EM models already available in physics. The known quaternion EM model comes readily to mind and it is strongly suggested, since it is also very close to Maxwell's original work and theory -- and that would be very fitting. But we desperately need to get that present silly EE model in all our universities changed to something other than a crippled old 1880s model! And we need to add at least basic group theory to the EE curriculum of every major university, and dramatically change what they are taught as "powering the EM system".

If this change is made and a well-funded crash program initiated, then very shortly we will rapidly start to see very clean "free energy from the vacuum" EM systems emerging, solving our electrical energy problem worldwide cleaning up our fragile biosphere, giving us very practical self-powered (powered directly by the seething vacuum) electrical vehicles, etc.

But to do this, we must get the scientific community to waken from its century-old slumber and its acceptance of the sadly mutilated and horribly crippled old EE model, and *forcibly* update and modernize electrical engineering itself.

As we have indicated, the answer is already there in modern physics; we just have to update the hoary and horribly flawed old classical electrical engineering to "catch up" to foundations of physics knowledge gained since 1892 when electrical engineering was deliberately mangled to prevent solving the energy problem.