

Extraction of Useful Energy from Electric Transients

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Abstract

A theory for power generation utilizing electric transients is presented whereby the Coefficient of Operating Performance (COP) is greater than unity. A simple circuit is presented along with a step-by-step explanation for the theory of operation. The ideas presented do not violate any laws of physics but perhaps apply them in ways not previously thought practical.

Background

Ever since time immortal, man investigated various ideas to harness the "wheel work of nature", in Tesla's words, to perform useful work. Many ideas have been pursued by countless inventors over the years and many ended in failure and disappointment. Anyone who has looked into a few of these machines has found deception for the purposes of financial gain, misguided or delusional inventors, or theories including metaphysics that are quite frankly difficult to believe at best. Also many inventors fail to offer a shred of proof or the possibility of repeatable designs.

Out of all these inventors, there is an exceedingly small number that may have succeeded in producing and demonstrating over unity machines. Unfortunately, of these precious few, many have trouble obtaining patents to protect their ideas or do not divulge all the details necessary to duplicate their inventions. There is also a small but noteworthy number suffering: untimely and mysterious deaths, economic hardships, defamation, and destruction or theft of property, all quite likely at the hands of special interests (e.g., big oil, energy companies, etc). Such activities are likely perpetrated out of fear, greed, and protection of wealth. There are multitudes of important social issues surrounding energy resources which could fill entire volumes. The future story of energy will be not only be recorded as a tale of technological advancement but also human nature.

The objectives of this paper are not quite so noble and focus purely upon the science. In this paper, I endeavor to present a theory for extraction of useful energy from electric transient phenomena. An electric schematic is provided along with a supporting thought experiment. For clarity's sake, I do not claim to have discovered anything but perhaps rediscover some knowledge of old.

A Theory from Circumstantial Evidence

Figure 1 shows an over simplified pulsed DC circuit. The circuit provides a source of DC power marked **V**, a switch at **S1**, and a coil inductor at **L1**.

Warning

If your design employs even moderate power levels and capacity significant energy will be generated: components may explode, arcing can eject liquid metal from terminals, wires and components may be vaporized generating harmful vapors, as well as ozone generation. At the very least, circuit components can be damaged. Experiment at your own risk!

Figure 1 is not a practical circuit of operation but suitable for our discussion given it's simplicity. No component values are shown but strict adherence to component values is not required for the purposes of our discussions.

Figure 1: Sample Circuit



The description for the theory of COP >1 operation is as follows:

- 1) A DC power source provides a source of electricity required for circuit operation at **V**.
- 2) When **S1** is closed, current flows into the **L1** coil and energy accumulates in the field of its windings. After a finite interval, determined by **L1**'s capacity, the coil becomes saturated and holds no additional field energy. Of course, energy is required to maintain **L1**'s field energy, energy is lost in Joule resistance heating, and stray capacitance within the circuit, etc.
- 3) **L1** does not charge instantly when **S1** is closed, back-EMF (back Electro Motive Force) is generated. Back- EMF is the power in opposition produced by **L1** in response to the rise in circuit potential (e.g., Lenz Law) when the battery is applied to the circuit. Back- EMF is generally undesirable since its energy in opposition to forward- EMF performing useful work.
- 4) Next, switch **S1** is opened. This removes power **V** from the circuit rapidly changing circuit potential, resistance, and generates a large transient energy spike. The rapid change in resistance, a change requiring little work, creates transient energy that may be many times the input energy. The energy of the transient is not subject to Lenz Law but instead Ohm's Law.

- 5) The magnitude of energy released by the transient is governed by the change in electric resistance. More gap in the switch is more resistance and therefore more energy released according to Ohm's Law.
- 6) The preceding circuit described complies with Ohm's Law, $V = IR$, or Voltage = Current x Resistance at all times.

Developing Lines of Thought...

- Ohm's Law applies to the energy you expend to charge a circuit.
- **New Insight** -- Ohm's Law also applies to the energy expended by surrounding medium to restore balance back to the circuit (e.g., discharge). Nature must also follow same rules as you.
- Circuit symmetries between charge and discharge cycles along with resistive losses ensure typical operating performances.
- **New Insight** – Circuit symmetries need not remain constant between charge and discharge cycles. Circuit resistance can be changed at will between charge and discharge cycles altering circuit energy.
- **New Insight** – The Law of Conservation of Energy is more correct than we realize. Nothing is free. The energy you place into a system must be removed by Nature to return balance to the system.
- **Back EMF** – Back EMF formulas apply to coils in closed circuits. The transient spike occurs during the open circuit condition(e.g., S1 open) is not described by Lenz Law but instead Ohm's Law.

Electric Power

$$P = V^2/R$$

The moment where circuit power is infinite (or very large) occurs exceedingly briefly just after the switch is opened. Successful circuit designs will employ pulsed systems where the abrupt interruptions are performed repetitiously magnifying the effect. Energy may then be shuttled around the circuit and made to do work.

Where's the Magic?

The magic is simply this; the balancing force to restore an electric circuit back to its original state is freely provided by the environment through back-EMF and transients(e.g., $\text{Forward-EMF} < \text{Back-EMF} + \text{Transients}$). To realize over unity effects a circuit is charged through a low resistance and subsequently discharged through high resistance like a spark – increasing circuit power. According to Ohm's Law an increase in circuit resistance increases the voltage and according the preceding Electric Power law subsequently increases circuit power.

Over Unity Secrets

The free energy secret I described previously is that output power and input power *are not* symmetrical. Specifically, output power far exceeds input power when circuit resistance is changed rapidly during the discharge cycle – a change requiring little work. The rapid increase in resistance triggers a massive inrush of energy into the circuit from the collapse of the inductor since voltage and current must compensate (recall $V=IR$).

Work though the previous formulas and convince yourself. I admit it does go against the grain of conventional thinking. The reason engineers and hobbyists don't realize the over unity effect I describe is two part:

1. Transients are regarded as an undesirable feature of our electronic. In fact, they are often purposefully minimized or engineered out of electrical designs where possible.
2. Engineers and hobbyists design devices based exclusively upon "closed circuits". Closed circuits are conservative by nature and thus no energy gains are realized. The work of the battery or generator in a conventional closed circuit simply pumps energy. Nothing is created that does not require work.

It's ironic that the effect we desire to eliminate from our circuits is the very effect that should drive all our circuits exclusively.

Consider a mechanical analog, a spring. Your hand pushes the spring to compress it – you perform work. When you take your hand away from the spring, energy within the spring or medium is returned to your hand – environment does work.

An electric circuit is *not exactly* like a spring. In an electric circuit we can charge the circuit through one modality, for instance a path of low resistance, and discharge in another a path of high resistance. The change in resistance, a subtle but significant one, alters the energy of the system. This is effectively like compressing a spring with your hand, once compressed, substituting it with a larger compressed spring and releasing additional energy.

Thinking back to our electric circuit, no laws of physics are violated since both circuit charge and discharge require work and the work supplied in both cases is consistent with the laws of nature. In the first case, you supply the energy. In the later, the energy is supplied by the medium surrounding the conductors. Typically circuit modalities are static or symmetrical during charge and discharge cycles such that the energy into the circuit equals the energy output along with some additional resistive losses but this is only a design limitation not necessarily a limitation imposed by nature.

Closing Comments

I will close with a short history of Ohm's Law as brilliantly told by Gustav Le Bon in *The Evolution of Matter* 1908.

"When Ohm discovered the law which will immortalize his name, and on which the whole science of electricity rests, he published it in a book filled with experiments so simple and so conclusive that they might have been understood by any pupil in an elementary school. Not only did he fail to convince any one, but the most influential scholars of his time treated him in such a way that he lost the berth he occupied, and, to avoid dying of starvation, was only too glad to take a situation in a college at 1,200 francs per annum, where he remained for six years. Justice was only rendered to him at the close of his life. Robert Mayer, less fortunate, did not even obtain this tardy satisfaction. When he discovered the most important of modern scientific laws, that of the conservation of energy, he had great difficulty in finding a review which would consent to publish his memoir, but no scholar bestowed the least attention upon it; any more, in fact, than on his subsequent publications, among them the one on the mechanical equivalent of heat, published in 1850. After attempting suicide, Mayer went out of his mind, and remained for a long time unknown, to such a degree that when Helmholtz re-made the same discovery, he was not aware that he had been forestalled. Helmholtz himself did not meet with any greater encouragement at the outset, and the most important of the scientific journals of that epoch, the *Annales de Poggendorff*, declined to insert his celebrated memoir, "The Conservation of Energy," regarding it as a fanciful speculation unworthy the attention of serious readers."

Our concept of free energy is poorly defined and our notions about it change as our science improves. Yesterday's free energy magic is today's science. Our ancestors would have marveled free energy photovoltaics. Today we understand photovoltaic power and know it's not free energy magic of any kind. It's possible there are yet undiscovered more important forms of energy throughout the cosmos than the forms we recognize today.

The book of science is not closed by any means. The purpose of science is to explain the world around us but also provide insight into what cannot be easily seen. The challenge today is many mathematically consistent theories exist to explain the known universe but are inconsistent describing hidden or secret properties of the universe. We will do well to put aside our scientific predigest and return to experiment.