Pulling energy from the ambient energy field using a coil capacitor

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Abstract

Today it is well known what electricity does. We can create, control and measure it as we please but we still don't seem to know what this energy is. What physical phenomena occurring in the movement of charge is giving power to our electrical systems. This paper presents a theory about electricity which explains what electrical energy is, where it comes from and how to access it efficiently at low cost using coils as capacitors. This theory is derived from Coulomb's law and from some well known laws of electricity. Schematics and some preliminary test results of a prototype device are shown that operates using the presented theory. The device could in theory produce over 150 watts using less than 20 watts.

Background

Nature is filled with charge and it is present as neutral, positive and negative charge. Neutral charge can be separated to positive and negative parts electrically by using induction. Like charges repel and opposite charges attract. Repelling or attracting electric force between these particles is governed by Coulomb's law. When separated charges move in various ways or unite to form neutral charge the result is electricity which provides energy.

Current electricity system

Our current electricity systems are all using electromotive force (EMF) where charge moves through load and forms a closed loop circuit. This is done by using electric force that is based on attraction of opposite charges, such as a battery or a charged capacitor, or repelling force of like charges such as a secondary coil of a transformer.

When a load is placed across source of EMF the charge moves through it according to $I=U/R$ and there occurs a voltage drop according to $U=R\times I$. Kirchhoff's current law states that in a closed loop system the sum of incoming currents is equal to the sum of outgoing currents. In other words, same amount of charge per unit of time that enters the load will come out from it. Charge becomes neutral when it enters negative terminal <u>after</u> it has came out from load. <u>Charge is not consumed by the load.</u> Kinetic energy of a charge moving through load remains unchanged because current through load is constant. The speed of this moving charge is also very low. When a lamp is switched on it lights up instantly so the energy moves much faster, at light speed. This indicates that charge moving through load is not powering the load. The source of power must be the voltage drop. To gain understanding what a voltage drop is, it is necessary to study the capacitor.

Capacitor

Initial condition in a capacitor is that both plates are filled with neutral charge. When capacitor is charged using EMF, charge separation occurs. First one plate is filled with positive charge. This splits neutral charge on the other plate and pushes positive charge away leaving negative charge in the plate. The amount of charge is the same on both plates but opposite in sign. Capacitor plates now attract each other according to Coulomb law, this is electric force. This force is proportional to the inverse of square of distance between capacitor plates so closer the plates are stronger the electric force between them.

Voltage drop across capacitor is defined as

(1) Voltage = Charge in coulombs/Capacitance in farads or $U=Q/C$

and energy stored in a capacitor is defined as

(2) Joules = 0.5 × Capacitance × Voltage × Voltage or $J = 0.5 \times C \times U^2$

One coulomb of charge in a one farad capacitor equals one volt. Energy stored in such a capacitor thus equals 0.5 joules. It can light a one watt light bulb for 0.5 seconds. If the area of the capacitor plates is reduced one million times so that capacitance is one µF things change quite a bit. One coulomb of charge in one µF capacitor equals voltage drop of one million volts. Energy stored in such a capacitor is 500 000 joules. This could power 500 watt lamp for 1000 seconds. This example shows that the amount of charge is not the source of energy, <u>the source of energy is related to the density of charge</u>. Same amount of charge in less space means that charge density increases as charges are closer to each other. When distance between charges decrease the electric force between charges increase according to Coulomb's law. This electric force is measured as voltage, therefore <u>voltage measures the density of charge</u>. Voltage drop across load means that the charge density is decreased. This is caused by repelling electric force between like charges that pushes them apart in every possible direction. <u>Individual charges expand inside load and release kinetic energy</u>. When distance between like charges becomes large enough, voltage becomes zero and there is no kinetic energy left. Charge is still present but it is at rest. This is illustrated in figure 1. Dotted circles denote the area where the electric field of a single charge ends.

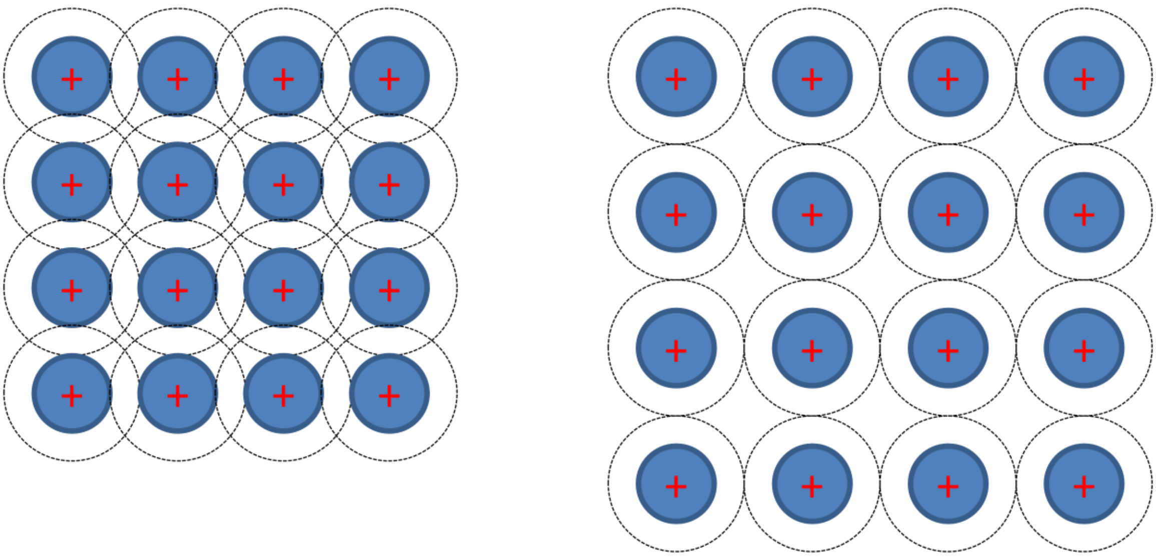

Figure 1. *High charge density stores kinetic energy while zero volts charge density has no kinetic energy left.*

Now the question arises what happens when the kinetic energy is released. Here is the breaking news: I have discovered that the kinetic energy released in the voltage drop is not being used by the load at all. Moving charge is just a way to access the energy from the ambient energy field. The more the charge expands inside the load the more energy will flow from the ambient. We know that a moving charge in a wire creates a magnetic field while charge that does not move does not have it. So far no one seems to know where this magnetic field comes from. Magnetic field around a moving charge is an ambient reaction to action. Moving charge disturbs the ambient energy field and magnetic field is created around the disturbance. Ambient is then out of balance and energy begins to flow. This energy is powering our loads. Thus current flow and energy flow are two different things. This contradicts our current understanding that current flow is the source of energy. Shortly I will describe a simple system that will prove the following items to be true:

①. Ambient energy field exists and it is everywhere.
②. Electrical systems use energy from this field. Unfortunately all access methods to ambient energy field are under unity.
③. Current flow and energy flow are two different things and it is possible to separate them.
④. Current flow through load is not necessary to power it.
⑤. It is possible to access the ambient energy field using a device that outputs more energy than what is required to operate it.

But first let's examine a load placed across a capacitor more closely to gain understanding how current electrical systems work according to presented theory.

Repelling electric force

What happens when load is placed across capacitor being used as EMF is depicted in figure 2.

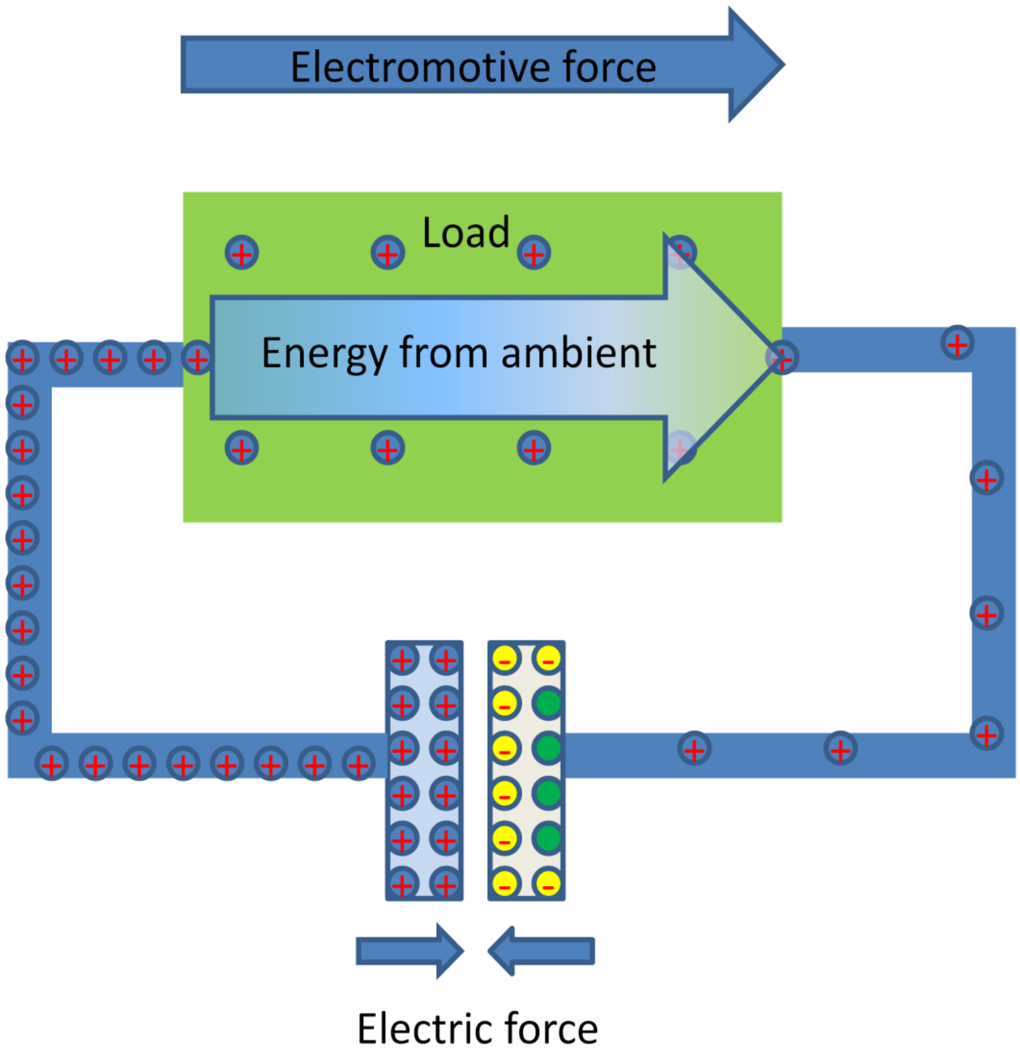

Figure 2. Load placed across capacitor which is charged with opposite charge.

1. Attracting electric force between capacitor plates creates potential difference which results in electromotive force when load is connected. Potential difference causes charges to move. Charge that enters into the wire from the capacitor plates pushes charge next to it which pushes charge next to it and so on. Eventually charge that is just about to enter into load gets a push. This pushing process in the 'charge pipeline' occurs at light speed. Charges themselves move at slower speed.
2. When charge enters the load, charge density decreases as repelling electric force between like charges pushes them away from each other. Moving charge creates magnetic field which disturbs the ambient energy field. Result is imbalance and energy begins to flow from the ambient into the ambient. <u>Most of the energy flows between points that are inside the load</u> because disturbance created by voltage drop is greater in the load than in the wire that delivers the charge. If voltage drop exceeds the rating of the load then the load will break.
3. Negatively charged plate pulls in the positive charge from the load and they combine resulting in a neutral charge.
4. More charge move into the load until all positive charge has been transformed into neutral charge.

What should be noted here is that charge that goes through the load is not needed for anything else than to allow positive charge to flow in from the other capacitor plate. Sole purpose of current in this system is to deliver charge into the load so it can disturb the ambient energy field there and pull energy from it. The charge flows in because of the potential difference between capacitor plates. The system has a negatively charged plate which attracts positive charge and consumes it by forming a neutral charge. To keep the system running the capacitor must constantly be filled with new charge and this consumes more energy than the system can produce.

Now that it has been explained where the energy comes from, it is possible to create a system that can access it more efficiently and pull in more energy than what is required to run the system. In this system energy is taken directly from the ambient energy field and only energy flows through the load. Ambient energy field, zero point, sea of energy, or whatever you want to call it, is not recognized by modern physics. Hence no physical laws are being broken here.

Let’s examine next what happens when both capacitor plates are charged using like charge and attracting electric force between plates is changed into repelling electric force.

Ambient energy collector (AEC)

A pair of coils wound on a core in dual helix fashion can be used to make a capacitor that can be charged using like charge. When magnetic flux goes through the core charge is induced into the coil pair. Electric force is created between endpoints of different coils and this is governed by Coulomb's law. I will call it electric field potential in this context. This is entirely different compared to electric potential between the endpoints of the same wire which obeys induction law. Induction law controls the charge distribution in a single coil and Coulomb's law controls the electric force between two charged bodies. In this case the charged body is a coil which has a non uniform charge distribution. Closer the turns are stronger the electric force according to Coulomb's law. Increasing the number of turns also increases the amount of energy that the coil pair can collect. Charge is pushed towards the end of the coil according to right hand rule and charge density increases as turns are added (voltage rise). Charge density is constant regardless of wire size. This means that wire which has large surface area will have more charge in it than wire that has small surface area. Wire with more charge on its surface will create larger electric field and it is therefore a better option.

Induction effect is maximized when capacitor is discharged through a spark gap into the primary coil. Pulses should be as short, strong and sharp as possible for maximum induction effect. This means that capacitor should have low capacitance, charge density in the capacitor should be high (high voltage discharge) and pulse should go off rapidly. The electric force between the coils of the coil pair creates an electric field which is perpendicular to wire. When it oscillates it results in the appearance of magnetic field component which is perpendicular to the electric field. Magnetic field is present outside the wire and it will also oscillate so it disturbs the ambient energy field and pulls energy directly from it into load. Charge does not move through the load at all and there is no current flow.

When the induction cycle has finished the charge will reflect back when it reaches the end of the output coil. As the charge is trapped inside the coil, it begins to oscillate at its own resonant frequency which depends on the coil's characteristics. The paired coils will have exactly the same resonant frequency and the electric field between them will also oscillate. When the oscillation has completely faded out before the next pulse the output power is directly proportional to the pulse rate. But if the next pulse occurs before fade out at the correct frequency then the result is resonance and a standing wave is formed. When resonance occurs in the coil the electric field between the coils will be in resonance which means that the magnetic field will also be in resonance. Resonant rise caused by the resonance will increase the electric field between the turns of the coil pair and the output power will be increased. Resonant rise is a well known phenomenon for those who are familiar with Tesla coils and it causes massive voltage increase when the standing wave is formed.

The amount of energy the coil capacitor system can provide to load is proportional to the electric field potential difference between adjacent turns. Greater the electric field potential difference more energy will be collected by the oscillating magnetic field that is created by the oscillating electric field. Two different coil winding techniques to illustrate how to make efficient use of oscillating electric field are shown in figure 3.

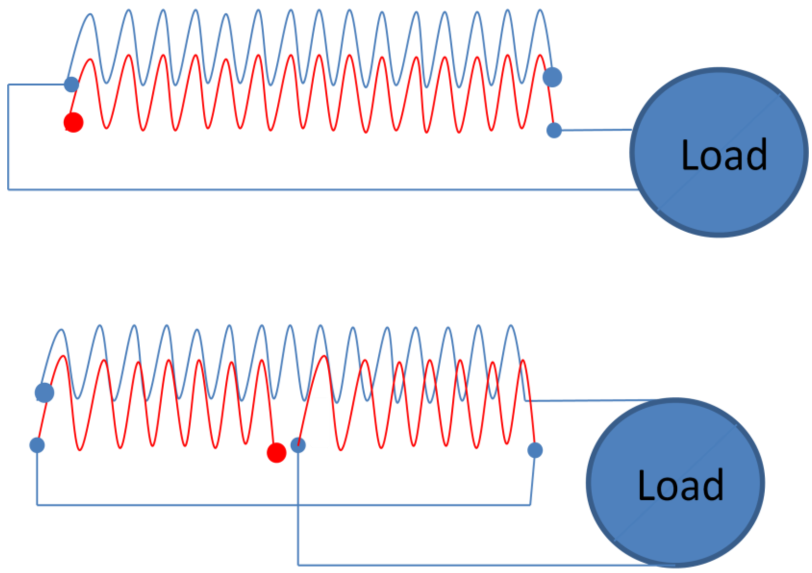

Figure 3. Two different coil capacitor systems.

Let's assume that coils are charged to 1000 volt potential and coils have 100 turns each. The upper coil system is wound using two wires side by side. Electric field potential difference in the pair on the same turn is zero volts and between adjacent pairs it is ten volts. This system will have an oscillating electric field of ten volts between 100 turn pairs. Coils ability to pull in energy is not good so it cannot power load. A pure white spark will occur between opposite endpoints of different wire and it looks like a continuous miniature lightning strike. But it cannot do much work. This can be changed if the coils are wound using a coil former so that there are many layers instead of just one. Then there will be greater electric field potential difference across layers and oscillating electric field is increased. The more layers are used the greater is the coil pair's ability to collect energy.

The lower coil system has maximum electric field potential difference when using 50% turn offset, i.e. one coil is started from the middle. In this case the difference is 500 volts in the same pair and 510 volts between adjacent pairs. This system will have an oscillating electric field of around 500 volts between all 200 turns and the available energy will be much greater compared to the other coil system. This coil system will collect more energy from the ambient energy field and it will power loads.

Proof to items ① ② ③ and ④

When charge is moving in a wire it creates a magnetic field around it and the wire becomes magnetic. Also coil that has current flowing affects other coils in the same core via mutual inductance. In the coil capacitor system these magnetic effects are missing. When shorting the output of a coil pair the wire ends do not stick and when they are pulled apart a pure white spark is formed between the wire ends. As the wires are not magnetic then current is not moving in them, only energy is flowing. The light bulb still provides the same kind of light and it heats up the same way when lit so it is using the same form of energy as charge that is moving through load. Therefore the source of energy is the same in both cases, only the access methods to it are different. This proves that current flow through load is not necessary to power it and that energy comes from elsewhere and it is separate from current flow. Electrical systems work anywhere on earth and in space, so the energy comes from a source that must also be everywhere. Energy comes from the ambient energy field.

In this system energy flows in from the point that has higher electric field potential and returns back to ambient energy field from the point that has lower electric field potential. These points are outside the load and therefore too high energy flow does not cause breaking of the load. Any load that is put in the energy flow can use that energy. Also, as the induced charge does not move and it is trapped inside the coils then resonance is possible in the output coils for even higher energy gains.

Some properties of the AEC

Since in this system charge does not form a closed loop circuit there is no counter flux created in the core that would affect to other coils. This means that many coil pairs can be charged from the same magnetic disturbance. For example, one coil pair can be used as feedback to make a self running system and additional coil pairs can be used to power loads.

Capacitor can be connected to the output of the coil pair parallel to load. Because both capacitor plates are charged using like charge, it is possible to exceed capacitor’s voltage rating safely without breaking it. I have successfully used 250 Volt AC capacitor and charged it to 1.4 kV at the output side.

The output coils do not produce any heat. I did not detect any heat when I tested a system which produced about 30 watts from one output and about 10 watts from another output.

Ambient energy likes load, read more about it in the testing section.

Ground, diodes and inductor have no effect to energy flow.

When load is connected or when output is shorted the device sounds like a cathode ray tube (CRT) type television set when TV is turned off. It is a continuous hissing sound which gets louder the more power the device is producing.

Operation of the basic driver circuit

The system should be pulsed to get most power from it. I used the basic capacitor discharge through a gas discharge tube (GDT) into the primary coil. This is illustrated below.

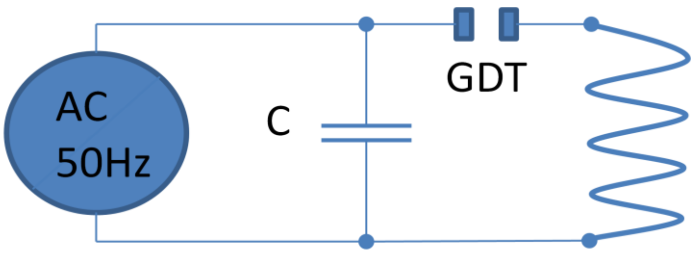

Figure 4. *The basic driver circuit using a gas discharge tube as a spark.*

Capacitor is charged with AC or DC and when it reaches high enough voltage it discharges through GDT into the coil. The size of the capacitor C controls the discharge rate. Lower capacitance gives more discharge cycles and it is therefore better. Shorter capacitor discharge time is also better than longer time. Obviously higher power will charge the capacitor faster than low power and this also affects the discharge rate. Voltage controls the energy of the hit pulse and higher voltage spark means stronger current pulse than lower voltage spark (I=U/(R+Z)). When voltage is doubled the energy in the pulse is increased four times as shown by equation (2). So by controlling the voltage of the spark the output power level can be controlled easily.

Inductance of the primary coil controls how much of the energy in the spark can be passed to collector coil pairs. Lowering the amount of turns will increase the voltage in the output and provides more energy but pulse needs to be stronger. When turns are added less energy is needed in the pulse and lower valued capacitor can be used. This will increase the pulse rate thus providing more power. Resonance effect will most likely affect this behavior such that it is not necessary to push the primary coil too hard.

When using primary coil that has high inductance the ohmic resistance of it will be of low significance. Impedance of high inductance coil will be high and it controls how much electrical energy is transformed into magnetic energy. Ohmic resistance of the primary coil controls how much electrical energy is wasted as heat. Keeping the Z/R ratio sufficiently high will enable more efficient pulsing.

For best results values should be selected so that one pulse does not saturate the core and the pulse rate should be high. It makes no sense to use too high energy in the hit pulse if all energy cannot be delivered to collector coils. It is better to use lower capacitance, higher voltage and use more pulses instead. Lower capacitance will also require less power from the step up transformer.

Device Testing

I had no measuring equipment available, only gas discharge tubes with known rating to determine voltages occurring in the test system.

All my power observations are based on the brightness of the light bulb that was used as a load. I used 220 volt 7, 15, 20, 30 and 40 watt bulbs.

Results from power generation testing

Toroidal core with permeability of 80000 was used in the test. Core was M-088 nanoperm from Magnetec. C-I type core would have made it easier to wind coils but I had to use what I had available. Schematic of the test system is shown below.

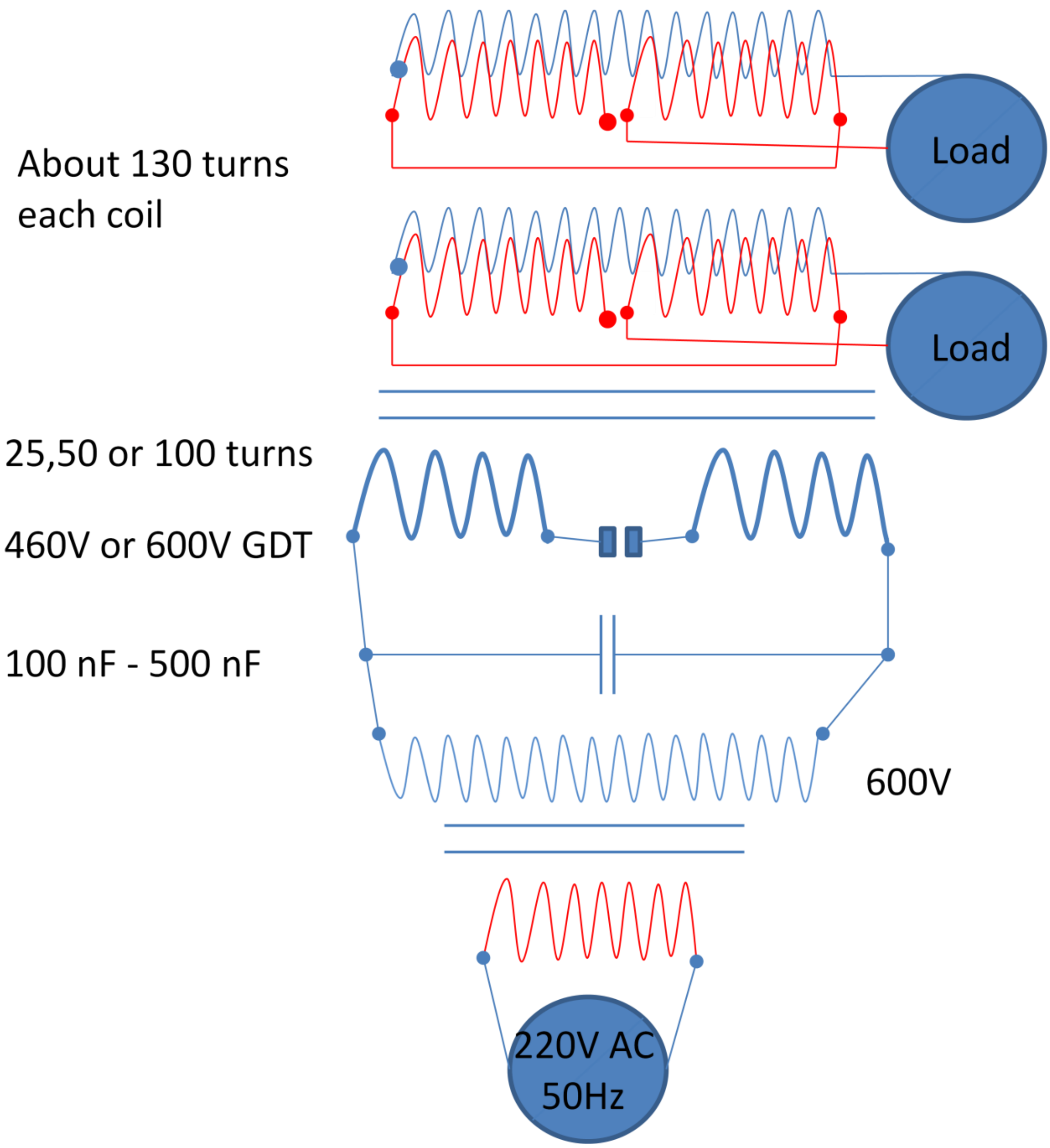

Figure 5. Schematic of the test system.

I used iron core and primary coils from a 20 watt 220V to 24V step down transformer to make a step up transformer that could give about 600 volts 50 Hz AC in the output. Each coil had resistance of 165 ohms and I used three in series to get 600 volt output. I could vary the capacitance of the capacitor that is discharged through GDT. Ten 1 µF capacitors were connected in series which gave several possible values for capacitor, namely 500nF, 333nF, 250nF, 200nF, … , 100nf. Values were bit too coarse but these were what I had available. I could also vary the voltage of the GDT and I used 460V and 600V sparks. I used 25, 50 or 100 turns for the primary coil of the coil capacitor transformer. Wire used for primary was 1.5 mm thick insulated multi strand wire for 25 turn primary wound around the core, two times 0.3 mm enameled wire for 50 turns primary and 0.3 mm enameled for 100 turn primary. The 0.3 mm coils were wound on an 8 mm wide coil former using two wires side by side. I used GDT in the middle of the coil when using 100 turns and in front of it when using lower turn count. I had heating problem in the step up transformer when using 100 turn primary. When GDT was placed in the middle of the coil the problem disappeared.

Coil capacitor coils were made using 0.3 mm enameled wire which had Mylar-C insulation. First coil was winded on an 8 mm wide coil former. I used layered coils on a coil former because it is more effective than layered around the whole core. Also in case coil is ruined it is easier to replace. About 10 meters of wire for each coil resulting in about 130 turns per layer and winding was dual helix style with 50% turn offset. Resulting coil was about 10 mm thick. Coils were winded as tight as possible and two wires were as close as possible for each turn. As the layers were added it was more and more difficult to keep the wires close each other. So the resulting coil was not very good but it still worked fine. Second coil was on a 25mm wide coil former and I used four 10 meter long wires, so it had twice as much wire compared to the first coil. Wires were layered in two separate layers, two wires per layer and layers were wound alternatively. Then two layers were connected using 50% turn offset: end of red wire on the first layer was connected to the beginning of red wire on the second layer and end of yellow wire on the second layer was connected to beginning of yellow wire on the first layer. This winding method gives almost exact 50% turn offset and there is no need to compute turns during winding.

Connecting load to one output coil had no effect to input power. I used current limiting light bulb on the input side so I could see if step up transformer draw more power from the grid. Connecting load to second output had no effect to first output. Few times I burned the coils so that there was a short circuit and a loop was formed in it. When this coil pair was used it affected to other coil pairs as it should be.

The optimum values for capacitor are listed in the table 1 when using different spark voltages and primary turn counts. Listed is also the amount of charge in Coulombs in the discharge and some testing notes. I decreased the capacitance until I got the most light from the bulbs and stopped when 100nf limit was reached. It was a bit difficult to determine the best value by monitoring bulb brightness only.

Turn count, wire diameter	460 volt	600 volt
25, 1.5 mm	333nf, 0.153mC, ①	500nf, 0.300mC, ③
50, 2×0.3 mm	250nf, 0.115mC, ②	333nf, 0.153mC, ④
100, 0.3 mm	< 100nf, <0.046mC, ②	250nf, 0.150mC, ⑤

Table 1. *Optimum value for capacitor and the amount of charge in the capacitor discharge with different spark voltages.*

① Two 230 V GDTs in series was used here. They became hot enough to melt insulation on a wire that it touched. The coils connected to them were not hot, so the heat was generated by the GDT.

② GDTs heated also with this setup. I used 15 watt bulbs. 25 mm coil gave more light than 8 mm coil, close to full brightness. 50 turn was better than 100 turn and 50 turn was about the same level as 25 turn.

③ Did not notice GDT heating problem anymore, 600 V GDT got warm though. Less output compared to test case ④. 40 watt bulb used at most 25 watts. The 500nf capacitor was too big as it caused too much current draw from the primary and it started to generate smoke. I stopped and waited for it to cool down for another test run. Restarted test but immediately loud bang ended up the experiment, something blew up. Step up transformer seemed to had some sort of problem in its primary coil and it stopped working. Luckily this was the last test in this series.

④ The noise level increased significantly compared to 460 volt spark. I used 40 watt bulb on the 25mm coil and 15 watt bulb on the 8 mm coil. I got about 30 watts from 40 watt bulb and about 10 watts from the 15 watt bulb. This was the best result with 600 volt GDT.

⑤ Less output compared to ④. 40 watt bulb on 25mm coil used at most 25 watts.

Results showed that increasing the turn count of the primary coil less capacitance was needed to saturate the core. The output power also seemed to increase as the turn count was reduced from 100 turns to 50 turns. Using 25 turns was less effective. Increasing the spark voltage had reverse effect on capacitor value, more capacitance was needed with higher voltage spark. This should not be like this, maybe the reason is that 460V spark was created using two 230V GDTs in series but 600V spark was made using only one GDT. When the spark voltage was increased the output power increased significantly. I estimate it to be at least a power of two increase.

I could fit four more 25 mm wide coils in this prototype so I should get about 150 watts from it using less than 20 watts. As the coils are time consuming to wind I will not do it at this early prototype stage because there are still plenty of interesting issues to be solved and further study this form of energy. These development items are listed in the ‘Future development’ section, see below.

Further proof that energy flow is separate from current flow

The fact that output coil pair does not affect to any other coils is enough to prove that current does not flow. As the absence of electric current forms the foundation to the whole ambient energy field theory it doesn't hurt to verify it using another test. I got an interesting result from the test which I want bring to your attention so I will briefly write about it.

This test would require a scope with a current probe which I don't have so I had to use another way. I used the 100 turn primary and 8 mm wide coil. This setup had the smallest turn ratio in the test system which gives highest current if present so it can be detected by hand. When the end of red wire was brought close to beginning of red wire a white spark was formed. Distance was about 5 mm. Yellow wire that had the turn offset was not connected to anything. Moving the wires closer a bluish color occurred in the spark as the current started to flow. Distance was much less than one mm, wires almost touched. Finally touching the wires made the wires stick together. The energy flow was clearly started before the current flow. When I did the same test with a light bulb connected the bulb brightness was dim when gap was about 5 mm, few watts only. Brightness increased to full when the loop was closed and the source was affected as well. This occurred because there were two energy flows. First energy flow was directly from the ambient and the second energy flow was started when the current started to flow. These two energy flows were added together and therefore the bulb brightness was increased.

When the end of red wire was brought close to the beginning of yellow wire the bluish color did not occur and the wires did not stick together. The white spark looked the same as before and only energy was flowing in this case. When the light bulb was connected to output there was about 10 watts worth of light when the wires touched the bulb. This was much more compared to the use of one coil only. Bulb was a little bit brighter when using a spark. It seems that the spark is able to pull in more energy from the ambient energy field. It was not much in this test but the increase was clearly noticeable.

Finally I connected the output coil pair so that there were just two coils in parallel and no turn offset between coils. The white spark disappeared so the electric field potential was clearly the reason for its presence.

Ambient energy behavioral testing

This section has many different test cases that help to learn more about this form of energy. I tried to put here all the tests I could think of. I used 50 turn primary, 600 volt GDT, 100 nF capacitor and the 25 mm coil set with current limiting enabled as an energy source. It lighted a 20 watt bulb to maybe ten watts.

Ambient energy flow likes load

In this test I used a tiny light bulb which was from a Christmas light set. It uses way below one watt of power and its voltage rating was at most 5 volts. First I connected the tiny bulb. There was the white spark but no light in the bulb. Energy was flowing because there was a spark and the bulb was not broken. Next I connected the wire to the tiny light bulb. Spark was gone but still no light in the bulb. It seems that the energy went around the tiny bulb and not through it. To verify this I placed a 20 watt bulb in series with the tiny bulb. Still no light in the tiny bulb but light appeared in the 20 watt bulb, about 10 watts. Next I replaced the tiny bulb with a 7 watt bulb. There was light in the 7 watt bulb but nothing in the 20 watt bulb. In the last test I replaced the 7 watt bulb with a 30 watt bulb so there were 20 and 30 watt bulbs in series. Now there was light in the 20 watt bulb and it looked again like ten watts worth of light and 30 watt bulb had no light. Bypassing the 30 watt bulb seemed to have no effect to the 20 watt bulb. It seems that the tiny bulb did not have enough resistance in it so the energy bypassed it.

Ambient energy flow through long piece of wire

I used a primary of a 28.8 watt transformer in this test. Resistance of the coil was about 200 ohms. I put it in series with a 20 watt light bulb and light went off. Energy flow was affected by the resistance of the coil. I was not able to measure if the coil produced any heat.

Ambient energy flow through a transformer

I used 30 meters of wire wound on a nanoperm toroidal core as a primary and then there was a pickup coil that had about 30 turns. I was not able to measure anything but shorting the output of the pickup coil did not produce any sparks. The same energy flow was able to light about 10 watts on the 20 watt bulb. When primary of the transformer was put in series with the light bulb it had no visible effect to the light. Could be that there were not enough turns in the transformer that was used in this test. To verify this I used the coil from ‘long piece of wire’ test above and filled the coil with iron plates and placed it on metal so that there was a closed iron loop, a sort of C-I core. Series bulb went off but that was because of resistance of the coil. I could not fit pickup coil in this test but there was no effect on the C-I core itself like noise or vibration. Could be that frequency was too high for iron but it seems that this energy form cannot create an induction effect.

Using horizontal pick up coil

Magnetic field appears outside the wire of the output coil pair and it is in the direction of the wire. Purpose of this test is to determine if this magnetic field can create an induction effect. This test required a special setup. Ten meters of 0.3mm enameled wire was wound horizontally around the circumference of the toroid, did not count the turns. On top of this horizontal coil there was one vertical output coil pair using ten meters of wire on eight mm coil former. The primary was 8 meters of 0.3mm wire on eight mm coil former and it was also vertical. In this setup the magnetic field from the vertical output coil pair will go through the horizontal pick up coil.

First the output was not connected and primary had current flowing. There was nothing in the horizontal coil, no sparks occurred when wires were shorted. Next the output coil was shorted but there was nothing in the horizontal coil. Finally I bypassed the current limiter but still nothing in the horizontal pick up coil. My conclusion is that there is no horizontal induction effect.

Ambient energy flow through a cut core

In this test I used at nanoperm toroid from which I had removed a 10 mm wide piece. I placed a coil through the hole and used it as a pickup coil. The pickup coil had some low power bulbs connected to it. First I routed the energy stream through the core with series bulb connected. There were sparks as before but no effect on the series bulb and nothing in the output bulbs. Then I removed the series bulb, bypassed the current limiter bulb and tested. Sparks occurred again but nothing in the output bulbs.

Same test through an iron E-I core transformer produced the same results.

Ambient energy flow through a diode

I placed two 300 volt 3 amp diodes (type P6KE300A TAZ) between light bulb and coil in opposing directions. Diodes had no effect to energy flow. Checked the diodes after the test and they were working correctly.

Ambient energy flow through a series capacitor

This was tested using 250V/3.3nf, 6 kV/10nf and 250V/500nf AC capacitors in series with the load. The 10nf and 500nf capacitors had no effect to energy flow. Brightness of the output bulb was the same in these two cases with and without capacitor. When the 3.3nf capacitor was used the bulb went off. I tested this with and without current limiter bulb. All capacitors remained intact during the test. I do not know the materials that were used in the capacitors. Capacitors can be used to limit energy flow.

Ambient energy flow through a magnet

This was tested using a strong neo button magnet in series with load. There were three different test cases for the energy flow: through the poles, through the sides and through one pole only. Sparks occurred when wires were placed close to magnet but no visible effect on the light.

Ambient energy flow and ground

No sparks occur between coil and ground. Connecting a light bulb between coil end and ground does not produce any light. Poking a live system with house ground wire has no effect on the output light bulb.

Using DC input in the basic driver circuit

50 Hz AC was changed into DC using a bridge rectifier. The spark gap position was varied and there were three possible locations for it: right after positive terminal, in the middle of primary coil as shown in figure 5 or right before the negative terminal. Ground had no effect in the driver circuit. Did not observe anything special, the load bulb was lit the same as before and the white spark also looked the same as before.

Ambient energy flow through a series DC capacitor

A 35 volt 2200 µF DC capacitor was added in the output when basic driver circuit used pulsed DC. I tested the capacitor both ways using with and without spark. The energy went through the capacitor as if it was not there and the capacitor did not produce spark when it was shorted. Capacitor remained intact during the test. Could be that capacitance was too large so this test should be verified using proper measuring equipment.

Using both outputs of the coil pair simultaneously

Diodes can block current flow but they cannot block ambient energy flow. So using blocking diodes the output coil pairs can be divided into two different sections so that electrical loops are not created between the coil pairs. I used the 25mm layered output coil from my earlier test system, 50 turn primary coil, 600 volt spark and a 100nF capacitor in this test. Schematic of the output section is shown below for reference.

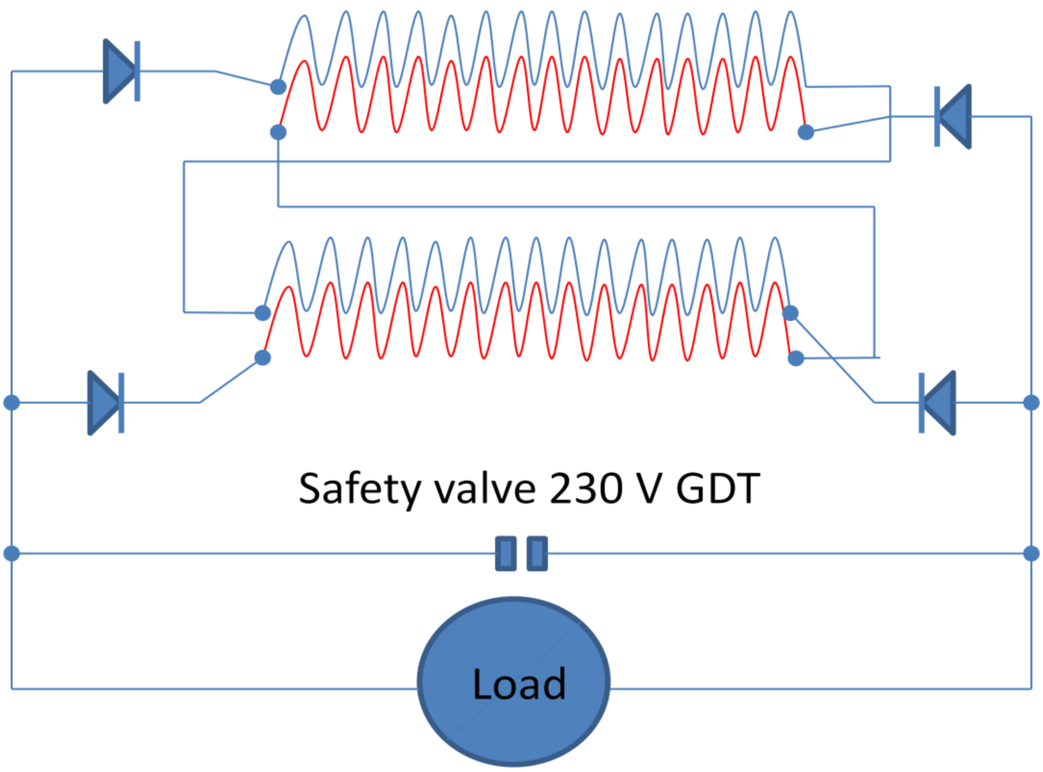

Figure 6. *Schematic of the output section of the tested system.*

There is a safety valve added across the load. When using coil offset the system gives more power but voltage rating of the coil's insulation can be exceeded easily. When this occur the output power will drop and the output coil becomes essentially useless. To prevent this from happening there must be a weak link which will break before the coils, a safety valve. Mylar-C insulation that is used in the output coil withstands 1000 volts so I used 230 volt GDT as a safety valve during this test. The safety valve will fire only when load is not connected. Three 300 volt three amp diodes were connected in series to form one blocking diode, twelve diodes were used in total.

I used current limiter in this test so that I could see differences more clearly in the 20 watt bulb that was used as a load. First one coil pair was unused and light bulb got power from one output only. When second output was shorted the light disappeared from the bulb. Next I added the second output to load bulb, first I connected one wire end and brightness of the light clearly increased. Then I connected the second wire end and it looked like bulb brightness was doubled when comparing to one output only. I cannot say for sure if adding the second wire end improved the output power though. Adding 25 watt load in the other coil set caused light to appear in the 25 watt bulb and the light disappeared from the 20 watt bulb. Then 25 watt bulb was removed and GDT was shorted which also caused the light to disappear from the 20 watt bulb.

Diodes were checked after testing was complete and they were all working correctly.

Diodes can be replaced with gaps that are long enough to prevent charge to jump across the gap. There must be one gap in each coil to prevent the forming of electrical loops for example as shown in figure 7.

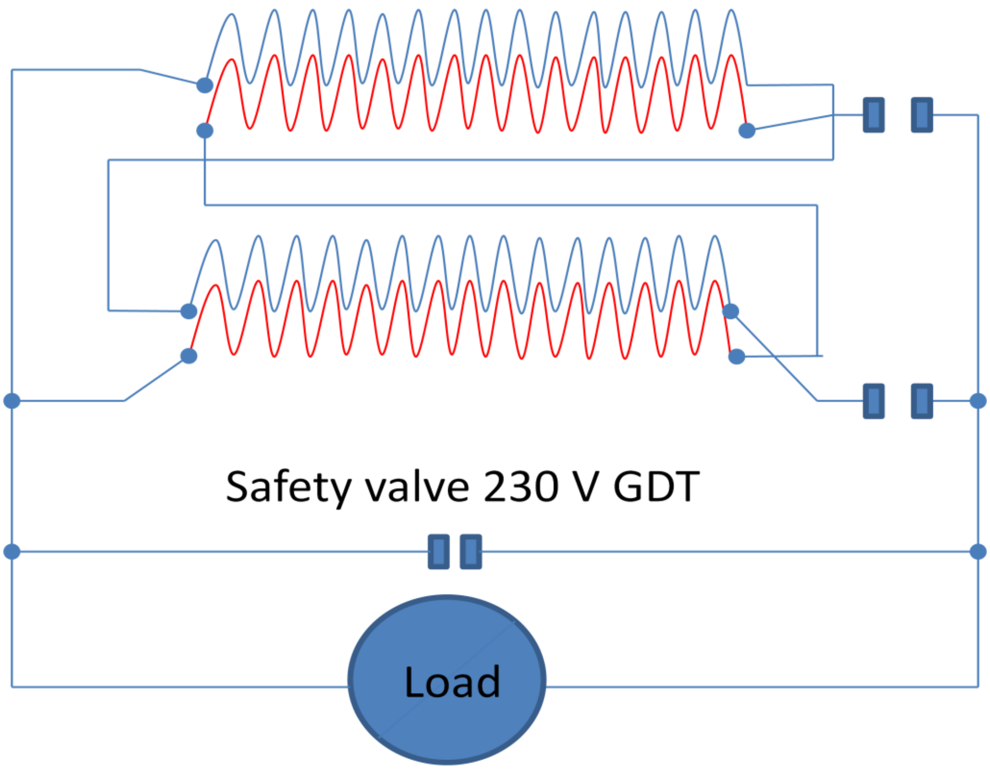

Figure 7. Replacing diodes using long spark gaps.

When studying for resonance effects it is better to replace all four diodes with air gaps. This will ensure that charge stays in the coils and that load does not disturb the resonance effect. Once the system is well known diodes with suitable voltage rating can be used to get rid of spark noise.

I have had problems with longer coils when using only one output and coils sometimes fried even when load was connected. When I started to use both outputs this behavior disappeared so most likely the problem I have had with coils leaking power due to weak insulation is now solved.

Conversion to hot electricity

Using circuit from the previous test I replaced the load with a 600 volt GDT and put 250V/100nF AC capacitor parallel to it. I briefly touched the GDT with the capacitor while circuit was active and some sparks occurred. Then I detached and shorted the capacitor, there was a spark. I repeated the test several times and sometimes there was no spark when capacitor was shorted. When this happened there was no spark when capacitor touched the GDT. Maybe a series spark with a capacitor is needed before something is stored in the capacitor?

Capacitor spark indicates the presence of charge. Since diodes prevent current flow from the output coils the only explanation is that ambient energy flow through a capacitor causes charge to appear on it. Similar behavior occurs in a Tesla coil when the streamer from the hot coil end enters metal object. The streamer itself contains no charge but the metal object is filled with charge. When the metal object is connected to ground the result is electric current. The spark from a Tesla coil is like a spray into the air while the spark in the AEC occurs between two points and it looks like a lightning. Sparks look clearly different but behave in the same way so they could well be different manifestations of the same energy form.

This should be retested using a scope to learn the differences between capacitors that are made from different materials. Using different metals as capacitor plates should be tested also, for example one plate made from copper and the other from aluminum like Don Smith used in one of his devices.

The effect of ground connection (or metal plate) on charge collection should be tested. When one capacitor plate gets filled with charge then ground connection would provide a way out for the like charge from the other capacitor plate thus creating greater potential difference between the capacitor plates. Charged capacitor could then be sparked through a step down transformer to get desired voltage/amperage output.

If capacitor is properly charged here then this could provide a method to convert ambient energy flow into hot electricity so it can be used to run electric motors. I think that there is no need for conversion when using lights or heaters.

Comparison between different output coil sets

The 25mm two layer output coil was compared against two 8mm single layer coil sets that were cross connected as shown in figure 6. The total length of the wire was the same in both coil sets. Result was that the two 8mm coils were better than one 25mm coil. Difference was small but noticeable. This is good news since it is easier to make output coils using only two wires simultaneously than four wires.

Testing incidents

Listed below are some incidents that occurred during the early stages of development when I was studying the effect. I put them here so that you can learn from them.

Insulate unused ends well

Unused ends of the output coil pair should be insulated and marked well. Once I touched both output wires when system was running and I got a shock that went up to my left arm. I was using 230 V spark and my input was current limited. The coil was able to give dim light in a 15 watt bulb yet the shock was quite strong. After this incident I started to dip unused ends in hot glue and then covered them using two pieces of electrical tape. Shock from one wire feels like a sting on the tip of finger, it does not go any further. This is possibly just a high voltage stinger.

Beware of static electricity shocks

I got once a static shock from the system when I was poking it with two wires that had thick plastic insulation on them. Wires were connected in series with light bulb and 3.3nf capacitor. I was holding one wire in my left and the other wire in my right hand and used them to bypass capacitor to study its effect on the energy flow. Suddenly my left hand fingers touched something and I got a static shock to same finger in both of my hands. It was weird and just a quick snap but it felt annoying. I don't know where I accidentally touched but I think it is better to **avoid touching any part of the system with anything when it is live**.

Current limiter

There should be current limiter in the input side during first stages of testing. Once you get to know the system you can gradually increase the input power. Pushing the system too hard too early will most likely fry the output coils. This may occur so that it can be noticed, white dots in the system and some noise, or it may occur silently. When one output coil affects the other coils when power is taken from it then there is a loop. There will also be more intense spark as a result of impedance drop caused by back EMF which is created when loop is formed. In case the system has two or more short circuits then electrical loops are formed between these points. This is harder to detect since these loops do not affect to other coil pairs: Current travels first clockwise from point A to B through one coil and then back to A counter clockwise through the other coil. This has no effect on the core and the only visible result is the drop of power level in the looped coil pair.

Coils in series can break wire insulation

In one test I used four coil pairs each on a separate 8 mm former. I used current limiter bulb on the input side and spark was 230 volts. First I put three coils parallel and compared output power against one coil. Three coils were better and it seemed that power scaled up three times as it should. Next I connected the three coils in series using a 33 % turn offset. One coil started from the first coil and the other started from the second coil. I did not use load on this coil but load was connected to the remaining coil only. When system was started the three coils in series fried instantly and were rendered useless. There was no heat or smoke. It is important to keep in mind the voltage difference between turns when using coil which has turn offset.

Better start using low power

I wanted to compare coils with and without turn offset. Coils were made using 10 meters of wire and were winded using an 8 mm coil former. I used 50% turn offset to get maximum effect. Current limiting light bulb was used and I gradually increased the spark gap voltage from 230 volts to 600 volts. I used 200 nf capacitor. Coil with turn offset was much more effective than normally winded dual helix coil. I got 40 watt bulb to about half brightness with current limiting on so next I bypassed the current limiter. Bulb lit to full brightness but after a few seconds the output coil fried and power output dropped. Again there was no heat or smoke. That was the end of that coil. I should have done bypass test using lower spark voltages first. I could fit ten of these in the core to get 400 watts output but obviously it makes no sense as the coils cannot withstand the power they pull in.

Heating problems in the GDTs

In one test I used 830 V spark (600V and 230V GDT in series) and a 100nF capacitor. When I pushed the driver using full power I got 40 watt light bulb to about 75% using one output coil pair. At the same time the 230 volt GDT began to smoke. The 100nf capacitor was too big and it created too large current pulse. I added turns in the primary coil and the spark was changed into a flame like spark and the 230 volt GDT started to work without too much heating problems. It still heated up but stopped to emit smoke. In general 230 volt GDTs are not good for this purpose as they always create too much heat. 600 volt GDTs were much better. Spark plugs might work better but I did not test with those because I didn't know the voltage of the spark.

Heating problems in the step up transformer

I use three 220 volt coils in my step up transformer. When I used the basic driver circuit of figure 4 using 100 turn primary, the coil in the step up transformer that was closest to GDT started to emit smoke. I think this was due to back spike that was created when the spark went off. When I put the GDT in the middle of the 100 turn coil so that there were 50 turns on both sides of GDT the coil did not overheat anymore. The nanoperm core was able to suppress the back spike. There were no heating problems in the output coils of the step up transformer when I used lower turn count in the basic driver circuit.

Primary coil of the step up transformer started to overheat when I bypassed current limiter and used 500nf capacitor. After a while of testing using full input power the primary coil finally exploded. Capacitor values below 250nf worked without problems.

Note the power consumption

The output coils may fry silently so take note about the power consumption of the system <u>before</u> any output coils are in place. This way it is easy to verify if your system has a leak later on.

Future development

I had only one kind of wire for pick up coils that had strong enough insulation on it. Effect of wire thickness on power creation needs to be investigated. Using well insulated copper or aluminum foil as a 'wire' will provide more capacitance between turns which should then provide more output power.

It would be interesting to study for resonance effects and create a standing wave in both coils of the coil pair. When load is connected in the output via air gaps or by using blocking diodes then this standing wave is not disturbed. In a Tesla coil type of transformer when the length of the output coil is one quarter of the wave length of the electrical disturbance a standing wave will be created in the secondary. Does this one quarter rule apply also when using a closed loop ferrite core? If so, then if the length of the output coil is low, say ten meters, then the frequency of pulses needed to create a standing wave will be in the MHz range. A signal generator using square wave and a scope is needed to find correct frequency. Once correct frequency is found then the energy of the hit pulse can be gradually increased to get to know the system better. This would require power control from the driver system.

One task is to try to make a self runner and power should be fed back to step up transformer part of the system. Feedback power level should be just enough to power the driver. Because the pulse rate depends on the power that is fed into the capacitor and also capacitance of the capacitor, both of these parameters should be adjustable. Feedback directly to the capacitor of the basic driver circuit is not an option because it could result in a runaway system. Alternatively some semiconductor magic could be done which would control only the pulse rate from the driver and replace GDTs with solid state switching.

A solid state Tesla coil system using two secondary coils instead of one would be worth testing. Turn offset should be used and the length of both secondary coils measured from end to end should be exactly the same. This is to ensure that both coils will have an identical standing wave at exactly the same frequency.

A better step up transformer is needed. It should be made from off the shelf components and it should have DC input. Frequency could perhaps be higher so that less turns are needed in its core. The basic driver circuit can use DC input so the frequency used in the step up transformer is not important as such.

Larger cores of C-I type should be experimented with.

Diodes have no effect on the energy flow. Maybe Germanium diodes would work better? How about different transistor types? Transistor that could use this energy would not generate any heat thus it could switch faster. Is anyone interested in developing a terahertz computer?

What happens when the spark occurs in water, can it split water into gas?

These tasks will take time and would require investment on some measuring equipment also. Results I have obtained so far are good enough for sharing this information so now it is time to get other experimenters involved.

Patenting

I do not believe that this device has anything that can be patented. The basic driver circuit and resonance in a Tesla coil has already been patented by Tesla. Also bifilar coil was patented by him. What is left is the use of two separate coils instead of one which provides direct access to ambient energy field as a result. But if one can patent a rounded rectangle then perhaps oscillating electric field between two surfaces could be patented also. However, I do not have any patenting plans.

End comments

I hope this presentation is clear enough so that replications can be made easily. Having said that*, I will take no responsibility of your actions should you decide to build this device*. This is a high voltage '**one hand in pocket at all times'** type of device and high voltage is lethal. Be especially careful if you try to close the loop or look for resonance. Playing with resonance should be interesting but dangerous so 'Let's be careful out there'.

In case I am the first person to have discovered this access method into ambient energy field then I will declare it open source. You can freely use this discovery. Any improvements you make in the basic ambient energy collector system will also be open source. Devices that use this new form of energy will be outside the scope of these licensing terms.

Discussion thread can be found at *http://overunity.com/17119/pulling-energy-from-the-ambient-energy-field-using-a-coil-capacitor*