

# Messages about the PickensPlan

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## ***Fuel-less, Battery-less Electric Car***

Dear Mr. Pickens:

I saw your plan in two different You Tube videos. As a Caltech grad (BS, 1954; MS in EE, 1954), I was impressed. IMHO, we, as a nation, should consider all of

the energy sources that you enumerated, but the "playing field" should be leveled. All government interference in the energy markets should be stopped. This will allow all technologies to compete--the market will select those technologies that are most cost-effective. It was government regulations, subsidies, and taxes that brought us the "energy crisis" (strictly speaking it is a power crisis rather than an energy crisis).

The energy crisis cannot be completely solved as long energy production depends upon consumption of material. Our scientific community tells us that that is impossible, but that hasn't stopped people from doing just that.

Consider Nikola Tesla's Electric Car which would go up to 80 MPH without any fuel or batteries.

See this URL: <http://www.reformation.org/nikola-tesla.html> scroll down to "Nikola Tesla's Electric Car." If Tesla could build an electric car that required no fuel or batteries in 1931 with the electrical/electronic components available then, why cannot we do it today. The answer is that the Electrical Engineering mathematical model was changed circa 1900 to exclude all systems that could result a COP greater than unity; Tesla used the model published by James Clerk Maxwell in 1864. See: M. W. Evans et al., "Classical Electrodynamics without the Lorentz Condition: Extracting Energy from the Vacuum," Physica Scripta, Vol. 61, 2000, p. 513 - 517.

## **WaterGas**

The energy crisis cannot be completely solved as long as energy production depends upon consumption of material (mass). Our scientific community tells us that that is impossible, but that hasn't stopped people from doing just that.

Consider, for example. WaterGas, also called Brown's Gas, HHO Gas, Hydrogen on Demand, Oxyhydrogen, and HydrOxy, has been known and used since the 1920s. WaterGas is made by disassociating water into it's constituent parts--hydrogen and oxygen. This is usually accomplished with an electric current and

called electrolysis.

Long ago the principle use for WaterGas was in a torch for heating, cutting, and welding metal. In recent times it has been used in automobiles to either decrease or eliminate the consumption of fossil fuel. The beauty of using WaterGas as the only fuel for a car is that it uses water to produce the gaseous fuel, burns the gas for the mechanical power to propel the vehicle, captures the combustion products (water vapor), and recycles the water. Thus, a WaterGas powered vehicle would produce no pollutants and would not require any pollution control hardware. The disadvantage of WaterGas as the only fuel for a diesel engine is that it will not work.

This URL: <http://www.hydroxy.net/w/images/f/ff/D9-20080503.pdf> downloads an article that discusses both automotive uses of WaterGas with emphasis on eliminating fossil fuel entirely. It is clear that while the automobile engine can generate enough electricity to power an electrolyzer capable of increasing the mileage by up to, perhaps, 20% eliminating the need for fossil fuel entirely is a different matter.

The 3 URLs below explain the physics that supports an electrolyzer that produces enough WaterGas to power an automobile while the electricity needed to electrolyze the water is generated by the auto's engine. This means that the electrolyzer produces WaterGas at a rate up to ten (10) times the rate per ampere that Michael Faraday determined 160 years ago. The Michael Faraday limit has been firmly fixed in science because scientists eschewed non-equilibrium, asymmetric electrical systems which, thermodynamically, are non-equilibrium steady state (NESS) systems. Actually the possibilities for asymmetric electrical systems were removed from the mathematical model used for electrical engineering around the beginning of the 20th century.

<http://www.cheniere.org/correspondence/042208a.htm>

<http://www.cheniere.org/correspondence/042408.htm>

<http://www.cheniere.org/correspondence/050208.htm>

# ***Increasing Power Plant COP***

As you know most of our electric power is produced by burning coal or petroleum products. Why do they do that? Combustion produces heat/steam to run a turbogenerator. Is it necessary to burn all that coal and petroleum? No!

In 1983 Craig F. Bohren published an article with a question as the title (See "How can a particle absorb more than the light incident on it?" Am. J. Phys. 51(4). (323-327)). The classical answer to the question (of the title) would be an emphatic "That's Impossible" and cite the law of conservation of energy. In general relativity, however, there is no such law.

But, the title came as a result of an experiment that since has been replicated in the non-linear optics lab of almost every university. The experiment works for light in the infra-red range (heat) for dielectric particles and light in the ultra-violet range (sun-burn) for conductive particles. If you read the article cited above, you will note that the particle absorbs (and re-emits) some 18 times more light than is incident upon it. This means the the particle amplifies the incident light by 18 times, that is, the particle in the experiment has a COP of 18. Where does the excess light come from? That question is answered in the reference below. Why has this not been used to produce all the power we need? Because it is impossible according the mathematical model used in Electrical Engineering.

The "Bohren Experiment" produces a COP of 18, but that is under ideal conditions. However, if under less than ideal conditions a COP of 2.5 could be obtained, regulated positive feedback would produce a source of heat energy that required NO fuel consumption. Existing coal burning power plants and existing petroleum products burning steam plants could be retrofitted with the technology explained below.

So far as I know the first time any inventor suggested the use of the excess energy demonstrated in the "Bohren Experiment" to produce electric power appears in a Provisional Patent Application which the inventors, Thomas E. Bearden and Kenneth D. Moore, released into the public domain.

The title of the Provisional Patent Application is at this URL:

<http://www.cheniere.org/techpapers/PPA%20Increasing%20COP%20by%20addnl%20extractn%20from%20flow1a.DOC> Titled: Increasing the Coefficient of Performance of Electromagnetic Power Systems by Extracting and Using Excess EM Energy from the Heaviside Energy Flow Component.

The number of kilowatt-hours (KWHs) per ton of coal (or barrel of petroleum) is proportional to the Coefficient of Performance (COP). Therefore, if the COP could be doubled, the coal (or/and petroleum) consumption would be cut in **half**.

The basic research has been done, the concept proven, the PPA written; all that is remains is for someone to spring loose with the funding needed for development and implementation. The government will never do it because the mathematical model used in Electrical Engineering does not allow it.

The energy crisis cannot be completely solved as long as energy production depends upon the consumption of material (mass).

## ***Renaissance for an Old Technology***

My previous three messages dealt with "new" technologies (or more correctly old technologies that have not perviously been used as a primary source of energy). Today, I explore an old technology that you mention in your PickensPlan, but which you gave a short shrift.

You discarded Nuclear Power because it took too long to build a nuclear power plant and then there was the problem of nuclear waste. There is a global bottleneck that prevents more than two or three new nuclear plants from being constructed each year--lack of capacity to cast the giant steel reactor pressure vessels and containment vessels.

Well, a new company, NuScale Power (see <http://www.nuscalepower.com>"), has overcome the problem of nuclear power by designing a nuclear power plant that can be mass produced complete and ready to be installed as a unit. The power plants are then shipped by rail, truck, or barge. The company also plans to provide a fuel reprocessing plant so the nuclear waste can be turned into new fuel. The French reprocess spent nuclear fuel--why can't we?

At this URL: <http://tinyurl.com/NuScaleAudio>" you can hear a pod-cast about it.

The NuScale Power system will produce only about 1/30th as much power as a large light water reactor. Its advantage is that it produces power with a greatly simplified system that has no valves, pumps or external piping systems. It operates at temperatures and pressures that are familiar in the industry, uses fuel that can be manufactured on the same lines as conventional reactor fuel, and uses conventional pressure vessel technology that is small enough to be produced in a number of qualified factories. The electric power portion utilizes an off-the-shelf General Electric turbine-generator set.

Work on this new power system began at Oregon State University in 2000, was "spun off" to a private company, NuScale Power, in 2003, and should be through the NRC certification process in another 7 years. Then, NuScale Power will set up an assembly line to prefabricate the power plants for sale to utilities world wide.

As I've said in each of my previous messages the energy crisis cannot be completely solved as long as energy production depends upon the consumption of material (mass). However, there is so much nuclear fission fuel available, when Thorium, Plutonium (made from Uranium in a "breeder" reactor), and Radium (from Coal Ash piles) are included, that there is enough for thousands of years.

## ***It's no longer funny***

My previous four messages dealt with "new" technologies (or more correctly old technologies that have not previously been used as a primary source of energy) and one old technology, nuclear, that you rejected. Today, I look at ethanol (ethyl alcohol). You said, in one of your videos, that ethanol was a joke (and I agree), but it is no longer funny because our Congress, in their infinite, unconstitutional, wisdom has mandated the use of ethanol in automobile fuels.

Here are the reasons that ethanol is a joke--somehow we've got to get the Congress to understand this.

First, it takes approximately 90% of the energy that burning ethanol releases to produce the ethanol. I don't know whether or not that includes the cost of growing the corn, transporting the corn, and transporting the ethanol.

Second, making ethanol from food is a really bad idea--people in India are starving.

Third, running a car on ethanol actually reduces the gas mileage (by 5% to 10% in my experience). See footnote 1

Fourth, using gasoline containing ethanol in small engines (lawnmowers, leaf blowers, chain saws, weed trimmers, etc.) is causing damage that is expensive to repair.

Fifth, fuel containing ethanol is no "greener" than straight hydrocarbon fuel; that is burning ethanol produces essentially the same amount of CO<sub>2</sub> per BTU as burning hydrocarbons.

Sixth, without a government subsidy ethanol laced hydrocarbon fuel costs more

per BTU than straight hydrocarbon. Even with the subsidy, ethanol manufacturers are starting to lose money.

Seventh, using corn to produce ethanol has approximately doubled the price of corn (imagine that) which has increased the cost of everything made from corn.

Note that the problems with ethanol are presumably unintended consequences even though most of them are predictable. Everything we do has consequences; once an act is committed the consequences are unavoidable.

## ***King Coal***

This message begins a series of 6 messages for each of the remaining energy sources that you enumerated on the You Tube video explaining "The Pickens Plan;" I previously discussed the Nuclear option.

From the founding of our Republic the principle source of energy was wood; to say nothing of horses and mules. In the 19th century people began to become fearful that if things continued as they were there would not be a tree left standing on the North American continent. Fortunately, our trees were saved by King Coal.

Later petroleum took over from King Coal. But, as you have noted about one-half of the electricity in the U.S. is still produced by coal-fired plants. Additional coal is used for various heating tasks including making Coke which is used in the manufacture of steel. So, it is good that we have lots of coal--estimated 1,500 years worth.

The problem with coal is that it is not pure carbon, but is one of the most impure of fuels. Coal ash is composed primarily of oxides of silicon, aluminum, iron, calcium, magnesium, titanium, sodium, potassium, arsenic, mercury, and sulfur plus small quantities of uranium, thorium, radium, polonium, bismuth, and lead. The gaseous emissions contains radon along with oxides of carbon, nitrogen, and sulfur. If the Nuclear Regulatory Commission (NRC) regulated *\*all\** power plants

the coal-fired power plants would all be shut down due to the emission of radioactive materials. This paragraph is based mostly on the website at this URL:  
<http://www.ornl.gov/info/ornlreview/rev26-34/text/colmain.html>

During World War II, Germany had lots of coal, but no petroleum. How did Germany manage to power all their military vehicles, ships, and airplanes without petroleum? They used a process they developed called the Fischer-Tropsch process. See this URL:

<http://en.wikipedia.org/wiki/Fischer-Tropsch> This or a similar process is used in South Africa to produce liquid hydrocarbons.

A small US-based company, Rentech (see this URL <http://en.wikipedia.org/wiki/Rentech>), is currently focusing on converting nitrogen-fertilizer plants from using a natural gas feedstock to using coal or coke, and producing liquid hydrocarbons as a by-product.

Syntroleum (<http://en.wikipedia.org/wiki/Syntroleum>) produces synthetic fuel by the Fisher-Tropsch process (referred to as FT fuel), which can use natural gas, coal, or biomass as feedstocks.

So it appears possible to produce all the liquid fuels we need from coal. I remember during WWII my dad kept a can of Coal Oil for use around our house, so it would seem that even then we were making liquid fuel from coal. Today, Coal Oil is called kerosene or #1 Diesel and is the main component of jet aircraft fuel, but it is made from petroleum rather than coal. The advantage liquid fuels from coal is that no modifications of our vehicles or the infrastructure at the retail end of the supply chain would be required.

So where do we get the extra coal? There are two possibilities: 1) mine more coal and 2) use the process described at

<http://www.cheniere.org/techpapers/PPA%20Increasing%20COP%20by%20addnl%20extractn%20from%20flow1a.DOC>

to reduce the coal consumption of the 150+ coal-fired power plants by 50%.

This would be an interim solution to part of the energy crisis. The energy crisis cannot be completely solved as long as energy production depends upon the consumption of material (mass).

## ***Natural Gas***

This message is the second a series of 6 messages on the energy sources that you enumerated on the You Tube video explaining "The Pickens Plan."

Natural Gas, mostly Methane (CH<sub>4</sub>), is widely used in the United States for domestic fuel, feedstock for various industrial processes, fuel to generate electricity (gas turbines and steam plants), and fuel for transportation vehicles.

I remember that in the early 1970's, the Southern California Gas Company pickup trucks used Compressed Natural Gas (CNG) for fuel. They seemed to be able to go anywhere in the City with only one fueling station--I don't know how far they could go between fill-ups. The CNG tanks were quite conspicuous in the back of the pickups (two to four tanks per truck). The U.S. Geographic Survey estimated that there was 600 years of Natural Gas supply in the U.S.; the Natural Gas from the Alaska North Slope was being pumped back into the ground because there was no pipeline (still isn't) to transport the Natural Gas to market and the environmentalists would not let them just burn the gas on-site.

That was then, now there are lots of fueling stations in the Greater Los Angeles area, but fueling stations for CNG are sparse to none very far removed from large cities. See

<http://www.cngnow.com/ENUS/VEHICLES/Pages/CheckCNGPrices.aspx> for locations of fueling stations in the U.S. There is also now available a home

fueling station that requires a natural gas line and electricity to fuel a car (or truck); again, however, natural gas lines are not available in remote locations. Bottom line: for a long time vehicles will have to be dual-fuel (either CNG or liquid hydrocarbons)--or stay near home. See footnote 2. Moreover, now we are importing Liquid Natural Gas (LNG); as I write companies are seeking permission to build three LNG terminals here in Oregon (most of the gas will be sent to California).

Another way to use Natural Gas would be to use the Syntroleum process (<http://en.wikipedia.org/wiki/Syntroleum>) to produce synthetic fuel by the Fisher-Tropsch process (referred to as FT fuel). The synthetic fuel (liquid hydrocarbon) could be distributed through the current gasoline/diesel infrastructure and used in current vehicles.

Whether we convert vehicles to use Natural Gas and build a whole new infrastructure for CNG distribution or build plants to convert Natural Gas into liquid hydrocarbons and avoid the conversion cost is really an economic question. The politicians seem to have made the decision to convert the vehicles to CNG and build the infrastructure; they have started providing subsidies to push the development their way. May I say that politicians have a track record of getting things exactly wrong?

Natural Gas for transportation vehicles (regardless of how it is used) is an interim solution to part of the energy crisis. The energy crisis cannot be completely solved as long as energy production depends upon the consumption of material (mass).

## ***HydroElectric Power***

This message is the third a series of 6 messages on the energy sources that you enumerated on the You Tube video explaining "The Pickens Plan."

See <http://en.wikipedia.org/wiki/Hydroelectricity> for extensive narrative on

hydroElectric power which is one of the three energy sources enumerated in the PickensPlan employing free energy and as such does not consume any mass for the production of electric power. The Coefficient of Performance (COP) (<http://www.emref.org/cop.htm>) of the system is, therefore, infinite. The power is produced from falling water, so in the final analysis the power source is gravity and is available 24/7 as long as there is water flowing in the stream, creek, or river. On a volume basis hydroelectric power is 7735 times more effective than wind because water is 7735 times denser than air (62.43 compared to 0.08071 pounds per cubic foot).

As an example, a 1.5 MW hydro electric plant might look like this (on my website, [www.emref.net](http://www.emref.net), there is code to allow the viewer to change the parameters):

Electric Power (P): 1500 KW (1.5 MW) Efficiency (E): 0.82 (82 %)

Height (H): 30 feet Flow (F): 720.0898 cubic feet per second

Velocity: 43.937 feet per second (29.957 MPH)

Size: 4.0484 feet (square pipe) 4.5681 feet diameter (round pipe)

Annual Electric Power Output: 13149 MWH

Initial Cost: 18 Kg Au (US \$ 486000) Ave. Annual Maint.: 0.1 Kg Au

See footnote 3 regarding Kg Au. 31.103481 grams = 1 Troy Ounce

Assumed price US \$ per Troy Ounce of pure gold: 839.79

US \$ per Kilogram: 27000

Design Life: 100 years

Annual Value of Electricity: 12.175 Kg Au (at US \$ 0.025 / KWH)

Break-even: 1.478 Years

Formula:  $P = EHK$

where K is a constant that converts the hydraulic power into electrical power units (=  $62.43 * 0.746 / 550 = 0.084678$ ).

The main disadvantage to hydroelectric power is that the site location is restricted to where water flows 24/7. Moreover, the environmentalists want to remove dams because they mistakenly believe that migrating fish will go to the spawning beds used many generations ago by their species if the dam is removed, but actually fish do not have written records of previous spawning beds. New small hydroelectric plants can be built without the need for dams and the impoundment of large amounts of water.

Most of the rivers with large flows have already had the available hydroelectric sites developed, but there are thousands of potential small hydroelectric sites that could be developed if the state (and local) governments will allow it (Dr. Arthur Robinson (<http://www.AccessToEnergy.com>) built such a plant, but the State of Oregon has yet license it for use).

The energy crisis cannot be completely solved as long as energy production depends upon the consumption of material (mass). HydroElectric Power is one energy source that can be part of of the long term solution to the energy crisis.

## ***BioFuels***

This message is the fourth in a series of 6 messages on the energy sources that you enumerated on the You Tube video explaining "The Pickens Plan."

There are two BioFuels that have been proposed--Ethanol and BioDiesel. I've already discussed Ethanol in my message # 5 titled *It's no longer funny*. BioDiesel is made from some kind of plant derived oil (mostly rapeseed (canola) or soybean

oil). In one respect BioDiesel suffers from one of the things that Ethanol suffers from--limited supply of the raw ingredients. Moreover, methanol or ethanol is used in the manufacture of BioDiesel. Using a food for fuel puts energy production in competition with food. This has the negative global effect of raising the price of food for developing countries.

One more recent development is the possibility of algae biodiesel (biodiesel derived from algae). This is still under development.

It is also possible to modify an existing diesel vehicle to burn used cooking oil directly, but this is not practical to replace the huge quantity of the diesel used for transportation. Rudolph Diesel originally demonstrated his engine using peanut oil for fuel.

A lot more information about Biodiesel is available at:  
<http://en.wikipedia.org/wiki/Biodiesel>

Some buses in Eugene, Oregon were run on commercially available biodiesel for one year. At the end of the year biodiesel was abandoned because it caused the bus company unspecified maintenance problems.

## ***Wind Power***

This message is the fifth in a series of 6 messages on the energy sources that you enumerated on the You Tube video explaining "The Pickens Plan."

Wind has been used for power since 3,500 B.C. In fact it was wind power that propelled the ships of Christopher Columbus and the Pilgrims across the Atlantic Ocean. For centuries wind power has been used to pump water, grind wheat (or

other grains), and propel ships. In the early 1930's small wind driven generators were being used on farms to charge batteries to supply power for lighting.

Wind is caused by the differential heating of the Earth by the sun so ultimately wind power is a form of solar power. Interaction of the wind with the land results in turbulence, in the form of eddies, so the wind velocity (speed and direction) varies, from minute to minute, at a given location. Due to the variability of the wind, the amount of energy produced by a wind turbine farm is less than that of a conventional (fueled) power plant; this difference is called the Capacity Factor (see "[http://en.wikipedia.org/wiki/Wind\\_power](http://en.wikipedia.org/wiki/Wind_power)"). The capacity factor for wind turbine farms typically ranges from 20% to 40%. Due to the relatively low capacity factor electricity generated from wind turbines cannot supply all the base load.

The alternators in wind turbines frequently are induction alternators (see Grid management system at [http://en.wikipedia.org/wiki/Wind\\_power](http://en.wikipedia.org/wiki/Wind_power)) therefore, some source of leading reactive power and accurate speed control is necessary. Usually the leading reactive power is supplied by banks of capacitors in the sub-station through which the wind turbine farm power connects to the electric grid; the electric grid alternators keep the frequency constant.

Power companies hate reactive power because reactive power does not accumulate on the electric power meter yet it produces resistive power losses in the power lines which the power companies must supply (for free to the consumer). Power companies install special meters that measure the reactive power where customers have large reactive loads so the power company can penalize the customer for having to supply excessive reactive power.

The effects on the environment of extracting relatively large amounts of power from the wind is not discussed in the reference. Environmentalists have hypothesized that a butterfly flapping it's wings in Brazil could cause a wind storm in Chicago. While that seems ludicrous it might not be so inconceivable that extracting 3,750 Mw (2500 X 1.5 Mw) from the Texas winds might affect the weather in Kansas or North Dakota. So an environmental impact study should be

performed.

The energy crisis cannot be completely solved as long as energy production depends upon the consumption of material (mass). Wind Power is one energy source that can be part of the long term solution to the energy crisis.

## **Breaking News about Wind Power**

Breaking news on Wind Power from an "article" published in The New American magazine for December 8, 2008 Page 9 titled: "Wind-driven Turbines Causing Problems for Neighbors."

"I don't think anyone should have to put up with this.' Headaches, nausea, and insomnia are some of the effects of the noise felt by Gerry Meyer and his family. They once welcomed the installation of five wind turbines near the Wisconsin home where they have lived for 37 years. Now retired, he travels all over the state to warn others to be wary."

In our travels we have driven close to lots of those wind turbines, but we've never stopped to listen (feel) the noise they undoubtedly generate.

Do you have any of your wind turbines near your home?

## ***Solar Power***

This message is the sixth in a series of 6 messages on the energy sources that you enumerated on the You Tube video explaining "The Pickens Plan."

The sun has been used for light since the beginning of time. Over the years solar

radiation has also been used for a wide range of uses including cooking, heating water, heating and cooling buildings, and generating electricity.

According to Wikipedia at [http://en.wikipedia.org/wiki/Solar\\_power](http://en.wikipedia.org/wiki/Solar_power)

"Photovoltaics are 85 times as efficient as growing corn for ethanol. On a 300 feet by 300 feet (1 hectare) plot of land enough ethanol can be produced to drive a car 30,000 miles (48,000 km) per year or 2,500,000 miles (4,020,000 km) by covering the same land with photo cells. [2500 / 30 = 83.3 LBB] The deserts of the South Western United States could produce sufficient electricity to fulfill all of the electrical needs of the United States, and could even electrolyze water into Hydrogen and Oxygen to power the entire U.S. land fleet."

According to Wikipedia at [http://en.wikipedia.org/wiki/Solar\\_power](http://en.wikipedia.org/wiki/Solar_power) photovoltaics are not the only or most efficient way to produce electricity from the sun, but photovoltaics are subsidized by the governments (federal and state) so they've become the only game in town.

The problem with both solar and wind power is that the electric power output varies with time. The problem with electricity generated from the sun, directly with photovoltaic cells or indirectly with wind turbines, is that the power can go away, partially or totally without warning. As a result there must be sufficient conventional generating capacity available to "get along" without the "alternative" power sources.

The effects on the environment of extracting relatively large amounts of power from the solar radiation is not discussed in the Wikipedia article. The energy crisis cannot be completely solved as long as energy production depends upon the consumption of material (mass). Solar Power is one energy source that can be part of the long term solution to the energy crisis, but because of the intermitency of solar radiation striking the Earth solar radiation cannot replace a single large conventional power plant.

# ***Breaking News on Solar Power***

Here is some breaking news on Solar Power:

**Absolute Proof that Operational COP>1.0 EM Systems Are Possible and Eventually Practical**

Brody, Herb. 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 photon can energize more than one electron. As soon as the electron absorbs a photon, it disappears for a very short moment into the quantum field. Being in the virtual state the electron can borrow energy from the vacuum and thereafter appears again in our reality. Now the electron can energize up to 7 other electrons. This leads to a theoretical coefficient of performance (COP) of 700%. A COP = 200% can be readily achieved and it has been. The experiment has also been replicated successfully by the National Renewable Energy Laboratory in Golden Colorado. [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?".

Additional references:

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.

There are more references and commentary at this URL:

<http://www.cheniere.org/correspondence/100608.htm>

# ***Conclusion and The Heaviside Plan*** <sup>TM</sup>

In this message I conclude my series of messages and introduce a plan **superior** to the Pickens Plan which I call **The Heaviside Plan** <sup>TM</sup>.

This is the twelfth in a series of a dozen messages about the Pickens Plan. Let me briefly review. The first three are about new technology that describe inventions that actually work, but most believe are impossible--*Fuel-less, Battery-less Electric Car, WaterGas, Increasing Power Plant COP*. Next, messages on Nuclear Power and Ethanol--*Renaissance for an Old Technology* and *It's no longer funny*. The next six discuss each of the six energy sources discussed in the video on the Pickens Plan.

## ***Executive Summary***

The Pickens Plan is designed to reduce the amount of natural gas used to generate electricity by up to 25% over the next 10 years by substituting Wind Power for natural gas. The natural gas would then be used for transportation replacing about 25% of the gasoline/diesel fuel used. The Pickens Plan requires a \$150 Billion subsidy (BAILOUT) from the Federal Government.

**The Heaviside Plan** <sup>TM</sup> is designed to replace **ALL** the coal, petroleum, and natural gas used in combustion to produce heat with infrared electromagnetic energy (heat) extracted from the active vacuum

over the next 40 years. The science for doing this is solidly established in peer reviewed physics journals but is unknown in electrical engineering. **The Heaviside Plan** <sup>TM</sup> requires payment of development costs of about \$58 Million, but

**no** subsidy from the Federal Government.

## ***Space Heat***

Small (5,000 BTU/Hour) Free Heat™ units would heat the individual rooms of the house or larger (up to 120,000 BTU/Hour) Free Heat™ unit for a central heating system. Larger units for larger buildings. These small Free Heat™ units would be a Godsend to third-world people who live in thatched roofed mud-walled huts and currently heat by burning dried cow dung.

## ***Hot Water***

Individual Free Heat™ units to heat water at the Point Of Use (POU). Individual POU units at each hot/warm water outlet will eliminate the need for a hot water tank and a hot water pipe to each water fixture. The POU's would be thermostatically controlled so the water would always be at the desired temperature after the first pint of water drawn.

## ***Cooking***

Five or six Free Heat™ units would provide heat for 4 surface "burners" and one or two ovens. Also, a Free Heat™ unit could provide heat for a forced convection oven (fast like a microwave oven).

## ***Transportation***

Here we have choices all supplied with heat with one or more Free Heat™ units three of the choices are: Multi-cylinder Sterling Cycle engine, Steam Engine (either reciprocating or turbine), Gas Turbine (Free Heat™ units would supply heat instead of burning jet engine fuel). One significant advantage of using Free Heat™ units as the energy source is that no fuel is carried in the vehicle; this allows for larger payloads in a given size vehicle (especially in aircraft).

# Electric Power

More choices and one size doesn't fit all; 1 GW central steam electric power generating plants, gas turbine powered electric power generators, thermoelectric generators. Each generator would be "fuelled" by one or more Free Heat™ unit(s) of appropriate size. Here I prefer the POU approach which would distribute the electric power generation to the individual building level. In 40 years we could eliminate the huge (1 GW) central (coal, petroleum, natural gas or nuclear fueled) electric power generating plants and the unsightly, terrorist target, weather impacted distribution lines.

## *Preliminary work*

Before we can get seriously started on **The Heaviside Plan™** it is necessary to correct the electrical engineering mathematical model that does not consider energy extracted from the active vacuum. This can best be done by providing research grants to a number of universities carrying the proviso that the grant be used to update the electrical engineering mathematical model to include the advances in physics during the last 144 years; 5 million dollars would go a long way here.



### Footnotes:

1) We would expect this just from chemical formula for ethanol,  $C_2H_5OH$ . Compare that formula to Ethane,  $C_2H_6$ . Ethanol is simply Ethane which has been partially oxidized (burned). The extra oxygen, O, atom in the ethanol molecule adds weight (and volume) to the fuel without adding (actually subtracting) energy. Gasoline is a mixture of different hydrocarbons of which Octane,  $C_8H_{18}$ , is the gold standard. The generic formula for saturated hydrocarbons is  $C_nH_{(2n + 2)}$ . The hydrocarbons are chains of the form  $CH_3:(CH_2)_{(n-2)}:CH_3$ . All the hydrocarbons produce about 20,000

BTU per pound when burned in air. If you don't understand this that's OK; this footnote is just to explain why ethanol reduces gas mileage.

- 2) What happens if you have a CNG only vehicle and run out of gas out in the boonies some where? I guess the mobile emergency fueling vehicles will have to be able to supply CNG.
- 3) We cannot use U.S. Dollars for 100 year projects, so we use kilograms of gold (Kg Au) for monetary units. During the last 100 years the U.S. Dollar has lost its **definition** and 95% of its value. Whereas, gold has retained its **definition** (Element Number 79) and its value for thousands of years. Things will get interesting as the U.S. Dollar loses the next 4% and dicey while losing the last 1% of its value. As a **consequence** of the \$812,000,000,000 "RESCUE" this result is all but certain. **Get gold prices for Troy Ounces and Grams** at <http://www.goldmoney.com> or **Metal Spot Prices in Troy Ounces** from <http://www.kitco.com>

Larry Brown

Your Eyes and Ears in SW Oregon

Now using a Mac Mini (Apple)

Send E-mail comments to: [Larry@yourfreeinfo.biz](mailto:Larry@yourfreeinfo.biz)