

BREAKTHROUGH ENERGY TECHNOLOGIES DERIVED FROM NEW PARADIGM SCIENCE

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ABSTRACT

In this age of climate change, the corporate, academic, and government research into new, green sources of power and energy still has not been well-funded nor forthcoming in this century. This presentation will review some of the best emerging energy technologies that promise green and carbon-free sustainable generation as well as food and water energy innovations, including a bioenergetics discovery. Progress is being made presently by academic and industry that will create a future having greater ease in newly developed renewable energy generation with much better, localized energy sources that do not use fossil fuel for power and heat. Beyond the realm of fuel cells and wind power is the non-conventional world of emerging energy technologies. Some of the best examples are new and exciting generators that release trapped potential energy from nature in ways never dreamed of before. Others innovatively apply clean fuels in conventional systems that are the focus of attention for NASA, DARPA, and the USDOE. Some of the more exotic examples include a recent breakthrough with graphene energy harvesting, which has thermal and nonthermal (quantum vacuum) sources to it. This illustrated slideshow presentation summarizes the research that has been accomplished so far in the development of highly efficient, energy harvesting inventions, as well as other future energy breakthroughs. The most exciting reason for the interest in this area of research is the promise that it holds for boosting electric vehicle production by providing an onboard electric battery charger. These energy generation developments, derived from relatively new paradigm science discoveries, also have many other applications, including a design for rural stand-alone electrical generators. Most of them have one thing in common: they are relatively unknown to the general public.

INTRODUCTION

Motivation for researching new energy include: 1) global warming adding 1°C every 20 years due to CO₂ buildup in the air which traps heat (See TinyURL.com/CO2HEAT), 2) resources for food and drink with 11 billion people expected by 2100, and 3) making a personal note that in my lifetime, since 1950 around the time that I was born,

- Population has tripled (3x)
- Carbon Emissions have quadrupled (4x)
- Energy Demand or Consumption has quintupled (5x)

Therefore, there is little debate among scientists and the public that we need new energy developments to save humanity.

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BACKGROUND FOR AN EMPHASIS ON URGENCY

Such an energy review aimed toward the future is a challenge to include remedies for power and food and waste conversion. However, at least for professionals, the primary theme of this chapter is clear and is actually the most compelling of any crisis today since it underlies basic necessities of life, rather than a temporary threat. We, the inhabitants of planet earth, are presently experiencing a 1.1° Celsius increase from baseline of 1925 NASA/GISS which presents a moving playing field that, as of April, 2020, created the 2nd hottest March ever on record.

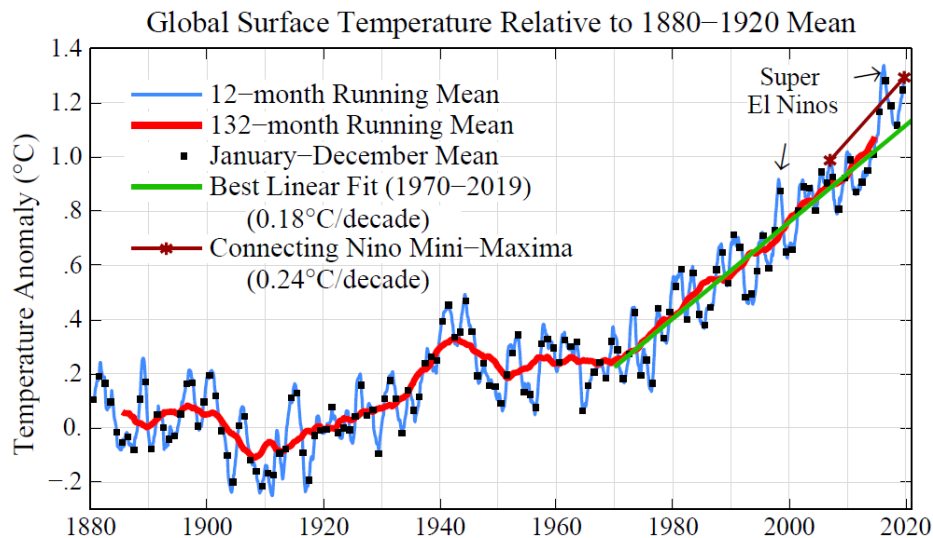


Figure 1. Global Warming - Manmade Temperature Anomaly

CARBON DIOXIDE LEVELS DRIVE GLOBAL WARMING

In addition, the published compilation from Vostok of global temperature, sea level, and CO₂ (same as “CO₂”) levels for the past 420,000 years shows a tight correlation of all three climate variables, so that a change in one parameter affects the other two very rapidly (in geological time). No one today, except for National Geographic, is revealing the real, desperate situation that this immediate future of a six degree rise by around 2100 presents to the world. The first graph (Figure 1) from NOAA of global temperature, will most likely become exponential with the increasing energy demand focused mainly on fossil fuel usage globally and unilaterally encouraged by the US government. It is important for any environmental team to start with the premise that the CO₂ driver for this rate of temperature increase is already on an exponential increase that is unprecedented in earth’s history (290 ppm has been the maximum CO₂ for the past 400,000 years and now we are pushing past 410 ppm only a few decades later, with no end or “peak” in sight of the level nor the rate of change).

The next Figure 2 is the best compilation, provided by James Hansen in 2006, including the off-the-chart famous “hockey stick” data point of 377 ppm (labeled “Global CO₂ level” in Figure 3) in 2006, now up to past 412 ppm in 2022. The CO₂ data point in question is significantly far above the highest point in Fig. 2 and also equaling a huge 45% increase in worldwide carbon dioxide levels since 1850.

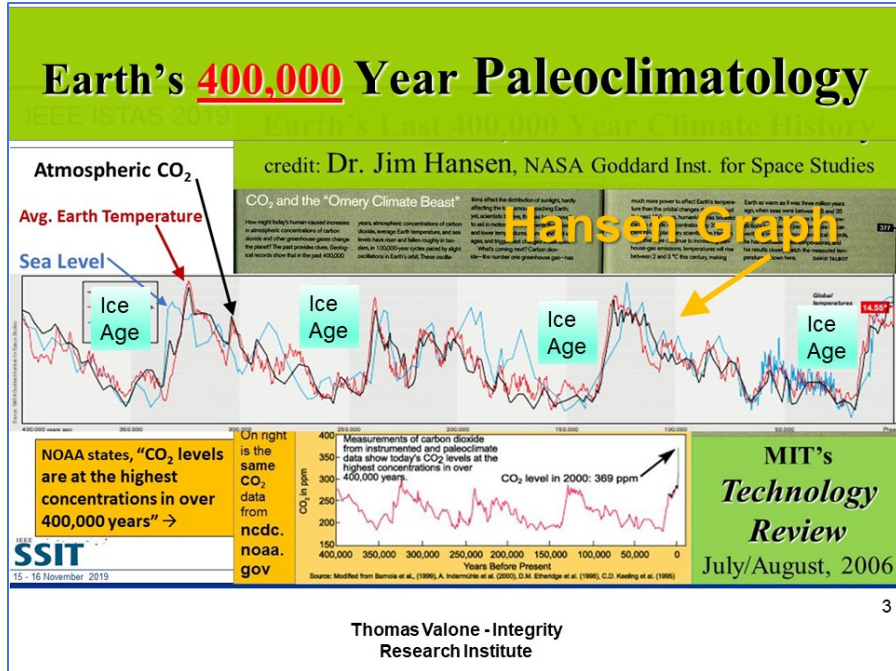


Figure 2. Paleoclimatology record of the past 400,000 years

What we notice in Figure 2 is the close correlation between all three variables of atmospheric CO₂ levels, average earth temperature, and the global sea level over the staggering period of 400,000 years. This information was gathered and analyzed by Dr. James Hansen from the Vostok Ice Core, a famous source of virgin ice from the Antarctica research station. It is also posted online conveniently labeled as www.tinyurl.com/400000years.

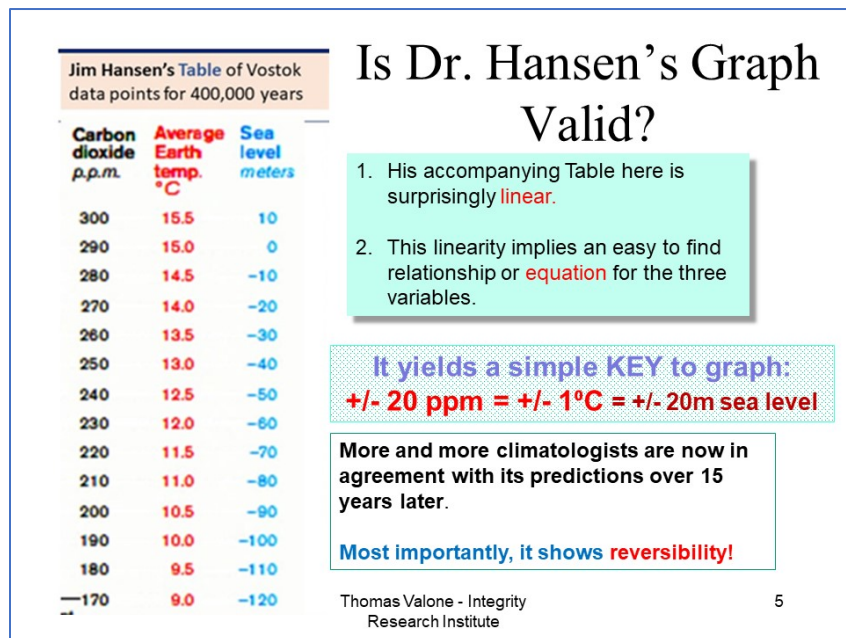


Figure 3. Is Dr. Hansen's Vostok Ice Core Analysis Graph Valid?

In determining the validity of Jim Hansen's impressive achievement in Figure 2, we note that it shows the distinct four past Ice Ages and the maximum of 290 ppm of CO₂ ever reached by the earth. Furthermore, we

note the clear indication of the 15°C pre-industrial global temperature maximum. So besides the thermal forcing that we humans are presenting to the world in an unprecedented short amount of time, the linearity of the data correlation between the three variables is surprising, in Hansen’s Table. The Table actually provides the Y-axis (vertical axis) grid lines for the three variables and leads one to immediately infer the simple relationship between temperature and CO2 levels, as well as sea level (which takes centuries to materialize).

$$\pm 20 \text{ ppm} = \pm 1^\circ\text{C} = \pm 20\text{m sea level} \quad \text{Eq. 1}$$

Therefore, we find that due to this author’s further analysis in creating an annotated enhancement to the graph online at <https://www.integrityresearchinstitute.org/CO2andClimateBeastgraph.jpg>, today the present CO2 level of over 410 ppm minus the pre-industrial 290 ppm yields about 120 ppm of excess CO2 in the atmosphere. Converting this amount to gigatons of CO2 we simply multiply by 7.77 GT/ppm to find the earth is indebted for about 932 GT of CO2 that MUST be removed by carbon capture on a gigaton level, probably over decades, to reverse the heating trend of CO2. Thus, with each 150 GT captured and sequestered underground in a carbonate rock, we will actually realize a 1°C DECREASE worldwide in our indebted temperature burden. Furthermore, by the time several degrees have been equalized and reduced by Carbon Capture and Storage (CCS) a cooling trend will start to become a welcome worldwide trend. However, realistically it will occur only a few decades from now. The leading companies for gigaton carbon capture are Project Vesta, which has as its website motto, “Harnessing the power of the oceans to remove excess CO2 from the atmosphere.” Visit <https://www.vesta.earth/> for more information about their exciting technique under evaluation in the environment at this moment. Carbon-removing sand made of the mineral olivine is added to the ocean. There, the sand dissolves, countering ocean acidification and permanently removing carbon dioxide from the atmosphere. Another great company with a different approach is CarbonEngineering.com in Canada. They use Direct Air Capture which is a technology that captures carbon dioxide directly from the air with an engineered, mechanical system. Direct Air Capture (DAC) technology does this by pulling in atmospheric air, then through a series of chemical reactions, extracts the carbon dioxide (CO2) from it while returning the rest of the air to the environment. This is what plants and trees do every day as they photosynthesize, except Direct Air Capture technology does it much faster, with a smaller land footprint, and delivers the carbon dioxide in a pure, compressed form that can then be stored underground or reused.

ProjectVesta.org → Gigaton CCS

- Carbon Capture and Storage (CCS)
- Chevron.com/possibilities: 4 megatons/year
- Vesta CEO projects cost at \$10/ton

Climate change / Carbon sequestration

How green sand could capture billions of tons of carbon dioxide

Scientists are taking a harder look at using carbon-capturing rocks to counteract climate change, but lots of uncertainties remain.

by James Temple June 22, 2020

MIT Technology Review

Rolling stones; fast weathering of olivine in shallow seas for cost-effective CO₂ capture and mitigation of global warming and ocean acidification

R. B. Silliman and F. L. de Beer

Harnessing Nature

Project Vesta’s approach dramatically accelerates Earth’s natural longterm CO2 removal process. We make green-sand beaches with a highly abundant volcanic mineral, olivine. We acquire nearby olivine and transport it to beaches where wave action speeds up the carbon dioxide capture process, while also de-acidifying the ocean.

COF12 2020 August 14-15, 2020
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Figure 4. Project Vesta is the most natural solution to gigaton CCS

CLEAN ENERGY BREAKTHROUGHS

A short list of the breakthrough new energy developments that have just transpired in the past decade or so include a wide range of relatively unknown sources, such as Thermal Fluctuations, Vertical Farming, Bacteria-Biomass Electricity, Triboelectricity, Solar Lights, Water Evaporation Power, Osmotic Power, Hydrokinetic Power, Energy Harvesting, Undersea Turbines, Magma Geothermal, Graphene Fluctuating Circuits, Wireless Electricity, Zero Point and Vacuum Energy. We will look at most of these briefly in the following sections but also provide links and references so the reader can follow up and research any particular topic more in depth.

Looking at vertical farming initially, it can be argued that this relatively new technology offers the very best and cleanest food energy solution to the growing worldwide droughts and anticipated global food shortage which will continue to grow as the globe keeps heating up degree by degree from manmade CO2 pollution. Looking the best vertical farming company in the world, Aero Farms, the chart below defines most of their achievements. More information, including a short video is online at www.aerofarms.com which is also publicly trading.

- World's largest
- 2 million pounds/year leafy green vegetables
- No soil, No pesticides
- 390x productivity
- **95% less water**

Another solution to world hunger is the incomprehensible and unimaginable discipline of Breatharianism, using the cleanest energy source known: prana from the quantum vacuum. Known to be practiced in India by sadhus and saints for perhaps thousands of years, the training involved is to achieve a state of no food intake and has been shrouded in secrecy. The *Autobiography of a Yogi* by Paramahansa Yogananda describes at least two breatharians, Giri Bala and Teresa Neumann, both of whom were saintly persons who stopped eating food early in life. Whether devotion to God is an essential part of the conversion from matter food input to prana light energy input to the body is debatable but surely a spiritual attitude helps, from my experience. This is mainly because the process or program of becoming a breatharian automatically influences one's belief system to become less tied to material things, including food and the depth of meditation improves. In fact, a universal experience even in the first week of training is the complete lack of a sense of hunger, which transforms a fasting experience into a prana development of absorbing energy from the surrounding space, from my experience and from reports of others who have achieved a year or more of no food intake. The book that started me taking the modern process or 21-day program seriously is *Life from Light* by Dr. Michael Werner, a biology professor, who has had trouble explaining how he is able to manufacture proteins, carbohydrates, vitamins, etc. from pure juices and other liquids like water, tea, and vegetable broth. For those interested, the book by Ray Maor, *A Year Without Food*, is the best beginner's guide mainly because Ray also offers online prana training programs that span 7 or 9 days, with a two-week follow-up totaling the traditional 21-day program. Ray is also a good teacher and has lots of successful students who help give their stories during these courses. His ebook version is online for free at <https://raymaor.com/ebookyearwithoutfood/>. A great video and possibly the only documentary available today is "In the beginning there was Light" on DVD and streaming at <https://www.lightdocumentary.com>.

Looking toward the sun, the source of light energy input for breatharians, plants, and the earth, there are companies now that offer small solar lights which really help to supplement and often replace the need for electricity. In Figure 5, we see a nice collage of the best solar light companies, including www.MpowerD.com which sends their “Luci EMRG” solar light to Africa with customer purchases and donations. The beauty of solar lights in places that have no electricity allows students to study at night after dark, like most of the world, so they can succeed in school. All that is required for them to do is to put the module out in the sun for about an hour before using it all evening.

Figure 5. Solar Energy Modules by various companies like Nokero and MpowerD

ENERGY HARVESTING

Moving onto a surprising topic of energy harvesting, we first examine the Craig Venter Institute testing 600 liters/day pig waste at local farm in Escondido CA and Penn State University both of whom generate kilowatts from human waste. BioVolt’s microbial fuel cell for example, uses GMO Geobacter strains which generate electricity, grow slowly and do not create microbe cake. Cambrian Innovation has also tested this at the Naval Surface Warfare in MD, scaling up from 2000 liters/day to 20,000 liters/day. Therefore, it is a self-powered system turning sewage into clean water and electricity with the help of microbes that do double duty, cleaning the water and generating biomass electricity with anaerobic digestion.

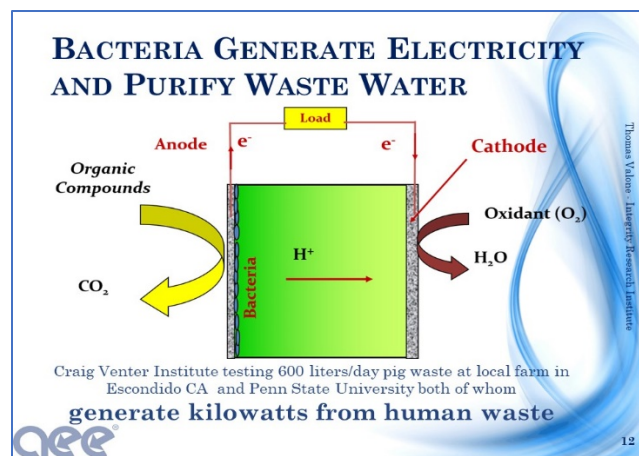


Figure 6. Bacteria generate electricity and purify waste water

The further development of this sorely needed addition to water treatment plants is the fact that Norway has been a pioneer into industrial size installations of the sort described above. In addition, the United States' Capital, Washington DC, also harnesses electricity from every flush with Norway's "Thermal Hydrolysis" method to convert sludge left over from sewage (with microbes) into 13 MW of electricity, which is quite respectable.

Energy Harvesting = \$7B Market

Energy Harvesting: Off-Grid Microwatt to Megawatt 2017-2027

Applications, technologies, forecasts including regeneration

By Dr Peter Harrop and Dr Harry Zervos

Triboelectric Energy Harvesting (TENG) 2017-2027

Commercialisation: Interviews, Forecasts, Materials Opportunities

Brand new for August 2016

Harvests electrostatic energy with polymers for self-powered systems

Triboelectric energy harvesting transducers will be a \$400 million market in 2027

Solar cell captures CO2 and sunlight, produces burnable fuel

Researchers at the University of Illinois at Chicago have engineered a potentially game-changing solar cell that cheaply and efficiently converts atmospheric carbon

ENERGY HARVESTING JOURNAL

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Figure 7. Energy Harvesting is predicted to be a billion-dollar market

With a report published by IDtechEx.com, we find the multifaceted arena of energy harvesting includes solar cells that capture CO₂ and produces burnable fuel, invented by the University of Illinois at Chicago. Potentially a game-changing solar cell, it is inexpensively converting CO₂ with sufficient voltage to split the molecule so it can be recombined into a hydrocarbon fuel. Such a solar cell is shown in Figure 8 but in this case, splits water instead of carbon dioxide, invented by Lawrence Berkley National Lab, Joint Center for Artificial Photosynthesis. This double duty solar cell, is called a Hybrid PhotoElectrochemical and Voltaic (HPEV) cell. It turns sunlight and water into not just one, but two types of energy: hydrogen fuel and electricity with a total of 20% efficiency. One part of the cell contributes to solar fuel generation and the other part generates electricity.

HPEV SOLAR CELL: ENERGY & FUEL

NOVEMBER 7, 2018 | PHOTONICS/OPTICS | ENERGY | IMAGING

Solar Cell Does Double Duty for Renewable Energy

NASA Tech Briefs, Nov. 2018
<https://www.techbriefs.com/>

Photronics & Imaging Technology INSIDER

Counter electrode
Chemical output
Electrolyte
Electrical power output

Hybrid PhotoElectrochemical and Voltaic (HPEV) cell

Turns sunlight and water into not just one, but two types of energy: hydrogen fuel and electricity

Lawrence Berkley National Lab
Joint Center for Artificial Photosynthesis

7% efficiency: solar hydrogen fuel
13% efficient: electricity generation
20% total efficiency

The HPEV cell's extra back outlet would allow the current to be split into two, so that one part of the current contributes to solar fuels generation, and the rest can be extracted as electrical power. (Credit: Berkeley Lab, JCAP) www.LBL.gov

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Figure 8. Hybrid Solar Cell produces energy and fuel

Triboelectricity (friction energy) is another unexpected market also projected to be a money-maker in areas that involve movement of surfaces that are in contact with each other, using polymers to harvest the electrostatic energy, expected to be a \$400 million market by 2027, shown in Figure 7.



Figure 9. Atmospheric Water Harvesting (AWH) collage

Atmospheric water harvesting is a growing technology for worldwide applications in areas that are expected to be hardest hit by future droughts brought on by global warming. Harvesting water from the air is a focus of the Project H2E. The H2E team was a small, interdisciplinary team made up of scientists, development experts, engineers, geospatial analysts, user researchers and industrial designers who have long been passionate about the challenge of access to clean water. Drinking water access is often hindered by a range of complicated factors and structural challenges that vary from place to place, including proximity to existing water resources, local community infrastructure, governance issues and more. Atmospheric water harvesters — devices which pull water from the air — have often been overlooked as a potential solution because of their relatively low outputs in comparison to other technologies, like desalination. One of their benefits, however, is that they can be built to be small, modular and renewably powered — decoupling them from some of the more systemic barriers to access. The team knew that such devices would never be the only solution needed, but their hope was that it could help fill a critical gap in places where safely managed drinking water was needed most. The X Company behind the Project H2E published their findings in Nature (Oct. 27, 2021) with an open access article “Global potential for harvesting drinking water from air using solar energy” <https://www.nature.com/articles/s41586-021-03900-w>.

Speaking of water, another area of interest for energy harvesting is undersea hydrokinetic energy which operates around the clock with a potential of 5 TW (5,000 GW) from the world’s oceans. Undersea Turbines are distributed to Wales and the Isle of Wight and a 200 MW field of marine turbines are in the Gulf Stream. Large ocean circulation currents are the marine energy sources for hydrokinetic power plants that float above the surface of the ocean with their turbine blades below the water. Surface entry exists from the top of these buoyed turbines to all systems. They also possess a high power-to-weight ratio and low cost deployment. The operation and maintenance are straightforward, with a stable spar buoy vessel anchored to seabed. AquantisTech.com is the leading company pursuing this clean energy technology. Other similar large scale generators include tidal power buoy generators, ocean current electrical generators, and floating ocean wave power buoys, all of which are in production and dispersed in various ocean locations around the world.

An unexpected water source for electricity generation is evaporation. Yes, Columbia University in NY found that energy harvested from evaporation can power much of the US, according to their study conducted in 2017.

Since this type of energy is so unusual, the slideshow presentation accompanying this paper has a demonstration on tabletop with a small car propelled only by evaporation and bacterial spores (see Figure 10) that expand when wetted. Such a tiny effect can, in bulk, produce an imbalance of the rotor tethered to the cart's wheels, thus propelling it forward. The video, accompanying a report in *Scientific American* (313, 26, Aug. 2015) is also on Vimeo <https://vimeo.com/235801232>.



Figure 10. Supplementary movie showing a small car propelled by evaporation

It may be emphasized that even the MIT *Technology Review* reported that an 8 cm by 8 cm water surface can produce about 2 microwatts of electricity on average, with a maximum of 60 microwatts. Thus, a large water body of square kilometers can produce kilowatts of power continuously when it is not raining.

Also water-related is the equally unknown clean energy source called Osmotic Power. With ion pressure across a semi-permeable membrane formed from a saltwater body, like sea water, being located near a fresh water river, Norway's Statkraft opened world's first osmotic power plant in 2009 to produce emission-free kilowatts of electricity. In Figure 11, we see what such an arrangement looks like with a natural boundary created in the Alaskan Krambeck, thereby suitable for an osmotic power generation station, as featured in *Nature*, July, 2016 (DOI: 20.1038/nature18593). It is also encouraging that the Nanoscale Biology Lab optimized pore size to dramatically increase power output and the Swiss EPFL reports an improved 1 MW per square meter output.

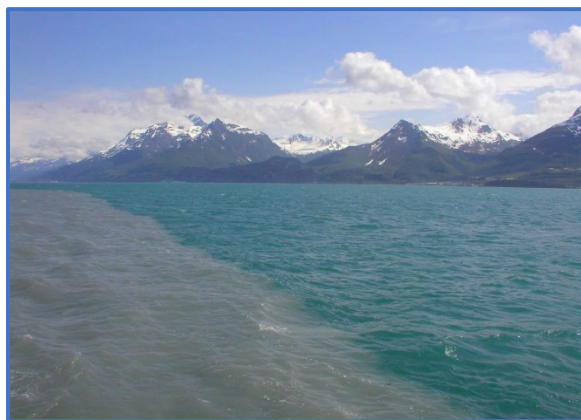


Figure 11. Natural boundary of salt water and fresh water in Alaska Krambeck

An online short video that is quite entertaining, created by the Swiss EPF Laboratory has been posted at www.tinyurl.com/SwissEPFL explaining how this technology actually functions in detail.

Creating a steamy finish to this series of water-based clean inventions is the amazing and relatively untapped source of power under the earth. In January, 2007, an MIT panel issued a report that indicated geothermal energy as a key US energy source (MIT.edu). The growth in geothermal power has steadily grown since 1970 in the US from about nothing to about 2800 MW of electricity around 2000, supplying about 4 million people. However, the geothermal power plants, which I have seen in California, do emit lots of water vapor in clouds of steam. Taking this technology one step further, is the unbelievable new paradigm science of drilling into the earth's mantle and tapping the ten times increased heat of molten magma. Think again. This is actually possible and has been achieved by one of the coldest countries in the world: Iceland. Iceland is the home of lots of volcanoes and therefore has access to molten magma about five kilometers below the surface. There, the HS Orka company has been able to generate 30 MW of power, as reported in *New Scientist* (Oct. 21, 2016), instead of only 3 MW if it drilled into normal, subsurface geothermal layered rock. Iceland's Deep Drilling Project (IDDP) is shown in Figure 12.



Figure 12. Iceland Deep Drilling Project into molten magma

Still in the category of energy harvesting is the recently discovered microscopic power generated from perpetually fluctuating sheets of atomically thin graphene. In October, 2020, Dr. Paul Thibado, physicist from the University of Arkansas announced that his team had successfully developed a circuit capable of capturing graphene's thermal (and nonthermal quantum) motion. Their circuit amazingly converted it into an electrical current by using two diodes in opposite directions so as to rectify thermal fluctuations. This huge breakthrough literally materializing the proverbial and elusive "free energy" is summarized in Figure 13. Furthermore, a few months later in December, 2020, NTS Innovations announced they had achieved a major milestone in its development of a revolutionary clean energy source – Graphene Energy Harvesting (GEH). The company, in partnership with the University of Arkansas. NTS has completed the development of its energy harvesting circuit on a silicon wafer. This technology is being packaged in a commercial chip and made available for purchase through a global network of electronics distributors. This singular achievement should be qualified for a Nobel Prize because of its unique and long lasting (perpetual) nature of its energy source at any temperature.

Graphene is 100x stronger than steel and a better conductor of electricity than copper. It is also flexible and elastic. What's better, when graphene is freestanding, it is actually in a constant state of motion. This motion is now being harvested as clean, sustainable energy. GEH is the act of harvesting energy at the nanoscale level from the naturally occurring oscillations in graphene.

GRAPHENE ENERGY HARVESTING (GEH)

Thermal (and non-thermal) perpetual motion: graphene nanolayers now in a GEH chip to be released this year by NTSinnovations.com

PHYSICAL REVIEW E
covering statistical, nonlinear, biological, and soft r

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Fluctuation-induced current from freestanding graphene
P. M. Thibado, P. Kumar, Surendra Singh, M. Ruiz-Garcia, A. Lasanta, and L. L. Bonilla
Phys. Rev. E **102**, 042101 – Published 2 October 2020

University of Arkansas NEWS

Thursday, December 30, 2021
Q SEARCH NEWS

May be the first commercial **Free Energy** device on the market!

Physicists Build Circuit That Generates Clean, Limitless Power From Graphene

Oct. 02, 2020
FAYETTEVILLE, Ark. – A team of University of Arkansas physicists has successfully developed a circuit capable of capturing graphene's thermal motion and converting it into an electrical current.

"An energy-harvesting circuit based on graphene could be incorporated into a chip to provide clean, limitless, low-voltage power for small devices or sensors," said Paul Thibado, professor of physics and lead researcher in the discovery.



Photo by Russell Cotvren
Paul Thibado, professor of physics, with sample energy-harvesting chips under development.



Figure 13. Prof. Paul Thibado's breakthrough clean energy, limitless power

To many quantum physicists, the option of seeing such a mysterious, fluctuating energy generator begs the question of whether it will also persist at very low temperatures near absolute zero. This experiment, proposed by this author to Dr. Thibado, is yet to be conducted, which would confirm a quantum vacuum zero point energy portion of the energy phenomenon. In Figure 14, we see other sources of information on this new paradigm of future energy science, thanks in part to Prof. Garret Moddel at the University of Colorado at Boulder, who has a Zero-Point Energy Laboratory constructing Casimir cavity devices and electronic rectennas that propose to utilize zero-point energy to generate electricity. His latest lecture is online at www.tinyurl.com/Moddel-ZPE .

Zero-Point Energy Technology

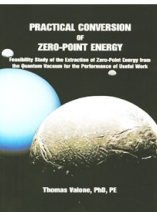
Casimir-cavity devices for zero-point-energy harvesting

***Lab Publications**

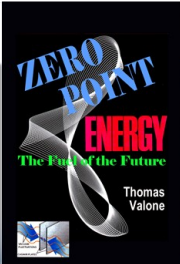
- "Casimir-cavity-induced conductance changes." G. Moddel, A. Weerakkody, D. Doroski, D. Bartusiak, Physical Review Research, 3, L022007 (2021); DOI: 10.1103/PhysRevResearch.3.L022007.
- "Optical-Cavity-Induced Current." G. Moddel, A. Weerakkody, D. Doroski and D. Bartusiak, Symmetry, 13(3), 517; doi.org/10.3390/sym13030517 (2021).
- "Extraction of Zero-Point Energy from the Vacuum: Assessment of Stochastic Electrodynamics-Based Approach as Compared to Other Methods," Garret Moddel and Olga Dmitriyeva, Atoms, 7 (51), 18 pages, (2019); DOI:10.3390/atoms7020051.

Presented at COFE5 held at U of Maryland by IRI

Further information – **Valone books** →



Thomas Valone, PhD, PE



Thomas Valone

Tinyurl.com/Moddel-ZPE
Best lecture by Garret ©

Rectenna Solar Cells, Metal-Insulator Technology & Geometric Diodes

Zero-Point Energy Technology

Low Energy Nuclear Reactions

Liquid Crystal Spatial Light Modulator

Additional Optoelectronics Technology

Thomas Valone - Integrity Research Institute

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Figure 14. Various sources of zero-point energy information

CONCLUSION

With such a cursory review of a wide range of new paradigm energy generation for the future, many discoveries have been left out to maintain brevity. Many expect that in the next few years, we will be able to modify the earth's atmosphere with sun shielding aerosols (that may have unexpected consequences) but offering time to develop the gigaton carbon capture we need for a long-term solution to global warming. Along with the environmental solution, the development of some of these wonderful, clean energy inventions will help enormously to bring the end to fossil fuel burning and continued gigaton addition of CO₂ to the atmospheric bank above us. Further information about future energy conversion breakthroughs include books by this author such as:

- 1) ***Nikola Tesla's Electricity Unplugged: Wireless Transmission of Power as the Master of Lightning Intended*** (Adventures Unlimited Press) which contains the best collection of articles by the world's experts in Tesla's wireless transmission of electricity;
- 2) ***The Future of Energy, Challenges, Perspectives, and Solutions*** (Nova Science Publishers) with a great selection of future energy paradigm shifting energy discussions such as zinc oxide nanostructures, solar energy, the fission-fusion energy generator, energy storage innovations, nonlinear magnetic energy device, the Manelas electric car recharger, low energy nuclear power, a theory of time effects, and gravity/antigravity;
- 3) ***Gravitoelectromagnetic Theories and Their Applications to Advanced Science and Technology*** (Nova Science Publishers) with topics including electrogravitics, coupling of electricity and gravity, the Biefeld-Brown Effect, electromagnetic gravity control theory, electromagnetoroid structures for gravity effects, plasma and gravito-electromagnetic forces.

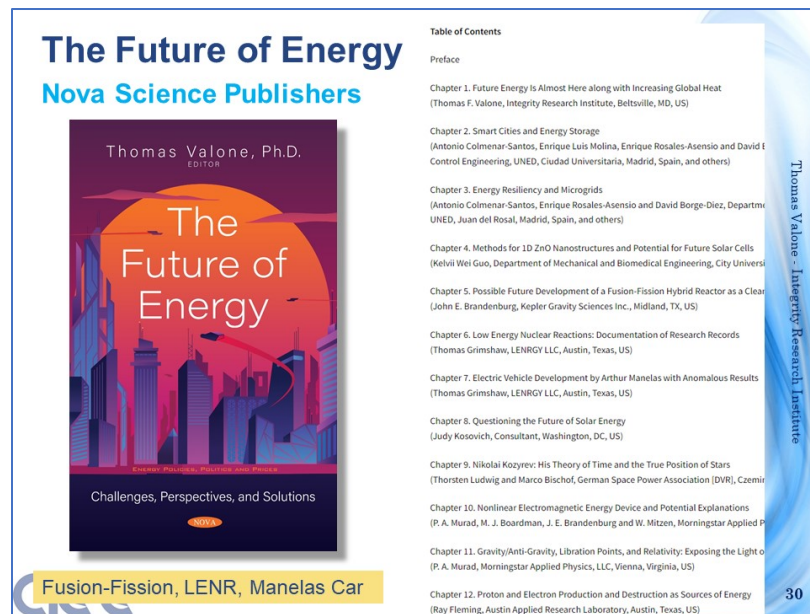


Figure 15. *The Future of Energy* by Thomas Valone, Editor