

Atmospheric CO₂

May CO₂ | Year-Over-Year | Mauna Loa Observatory



**Can Humanity
Save Itself?**

**Thomas Valone, PhD, PE
Integrity Research Institute**

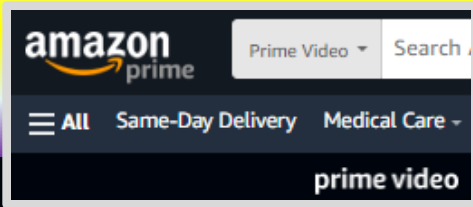
Saving Humanity Outline

1. Ethics and Morality as Applied to World
2. Environment and Climate Change
3. Energy Developments for the Future
4. Food, Health, and Drug-Free Bioelectromagnetics

An aerial night photograph of a city, likely New York City, showing a dense grid of lights and a large body of water in the distance. The sky is dark blue with some clouds. The text is overlaid in the center in a bold, yellow font.

**Ethics and
Morality
Applied to the
World**

Dr. Norman Borlaug



The Man Who Tried to Feed the World

Follow the story of Norman Borlaug, a man who not only solved India's famine problem but would go on to lead a "Green Revolution" of worldwide agriculture programs estimated to have saved one billion lives.

★★★★★ 16 IMDb 8.6 53min 1988 13+

Documentary · Edifying · Frightening

Free trial of PBS Documentaries, rent

1950 – Only 2 billion world pop. with 1 billion starving

PhD Biologist Norman Borlaug became a Nobel Prize winner
Hybrid grains that withstand drought and increase yield



He single-handedly created the "Green Revolution"

Global population has tripled (3x) since 1950; CO₂ emissions have quadrupled (4x); and global energy demand has quintupled (5x), all in the same time period.

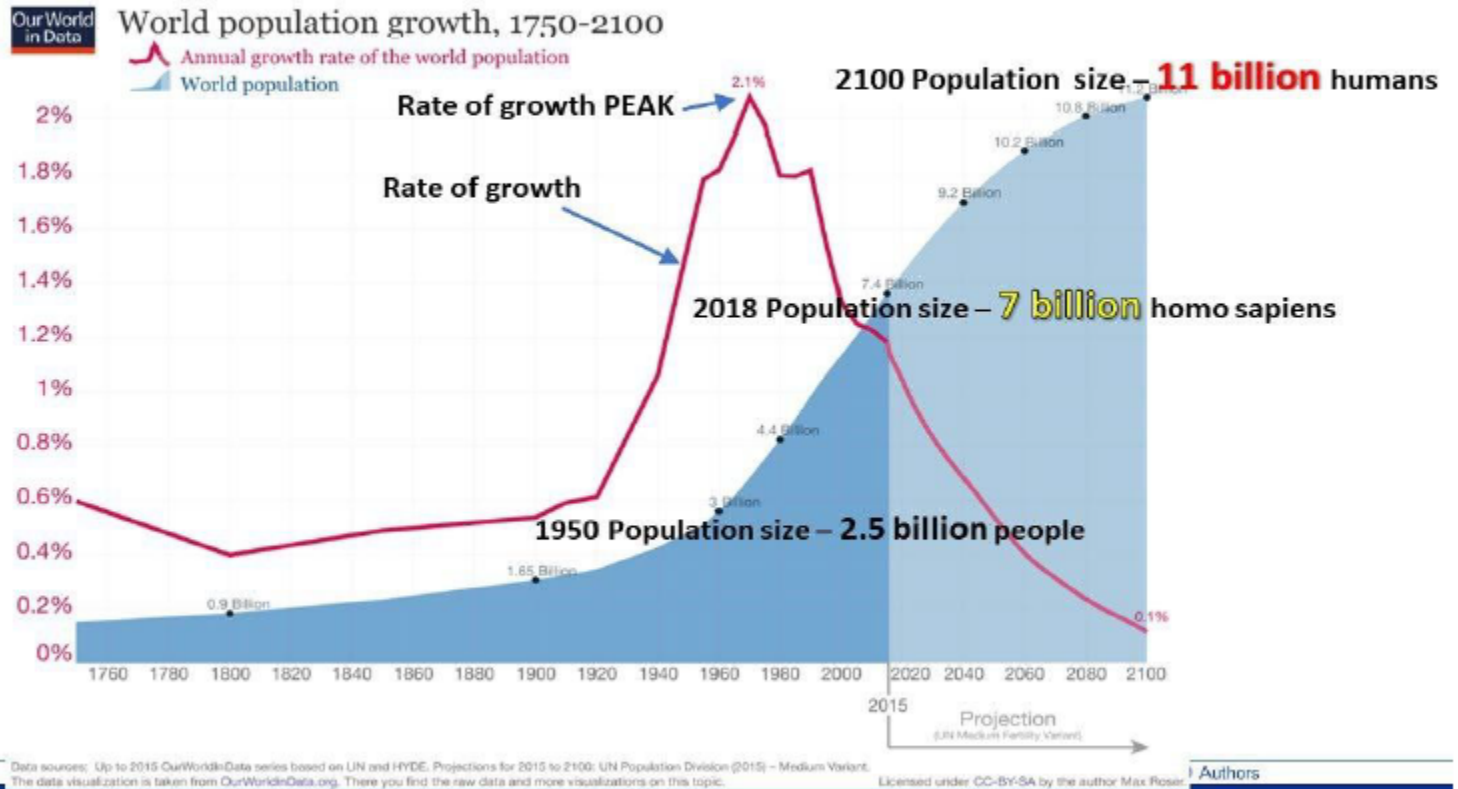


Fig. 1. World population growth [2]

A close-up photograph of an olive branch with several green olives. The branch is in the foreground, and the background is a soft, out-of-focus sunset or sunrise sky with warm orange and yellow tones. The sun is visible as a bright, glowing orb behind the leaves.

Environment and Climate Change

IEEE ISTAS 2019 ALASKA Columbia Glacier ONLY SIX Years Apart

Columbia Bay, Alaska – Photographer James Balog, Nat. Geo. magazine: **Extreme Ice Survey of 18 Glaciers**
The most extreme: Columbia Glacier is losing one mile every three years – so two miles of loss are shown below.
Since 1980, this glacier has lost height equal to the Empire State Building!



Fig. 6. Extreme climatic event [9]

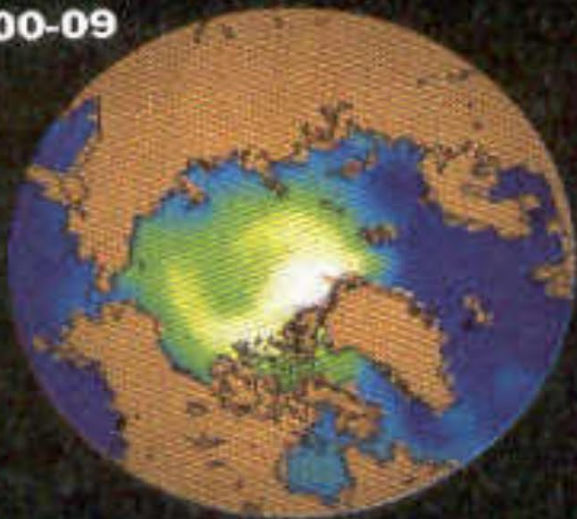
Rising temperatures . . .

Annual temperature increases, in degrees, since the 1950s



. . . and the Arctic ice cap to shrink

2000-09



Ice thickness

8 ft.

2 m

3 m

P O L A R N O T E S

The Hole at 90°N



ARCTIC "LAKE": Not all that unusual

Earth's Most Recent 400,000 Year Climate History

credit: Jim Hansen, NASA Goddard Inst. for Space Studies

CO₂ and the "Ornery Climate Beast"

How might today's human-caused increases in atmospheric concentrations of carbon dioxide and other greenhouse gases change the planet? The past provides clues. Geological records show that in the past 400,000

years, atmospheric concentrations of carbon dioxide, average Earth temperature, and sea levels have risen and fallen roughly in tandem, in 100,000-year cycles paced by slight oscillations in Earth's orbit. These oscillations

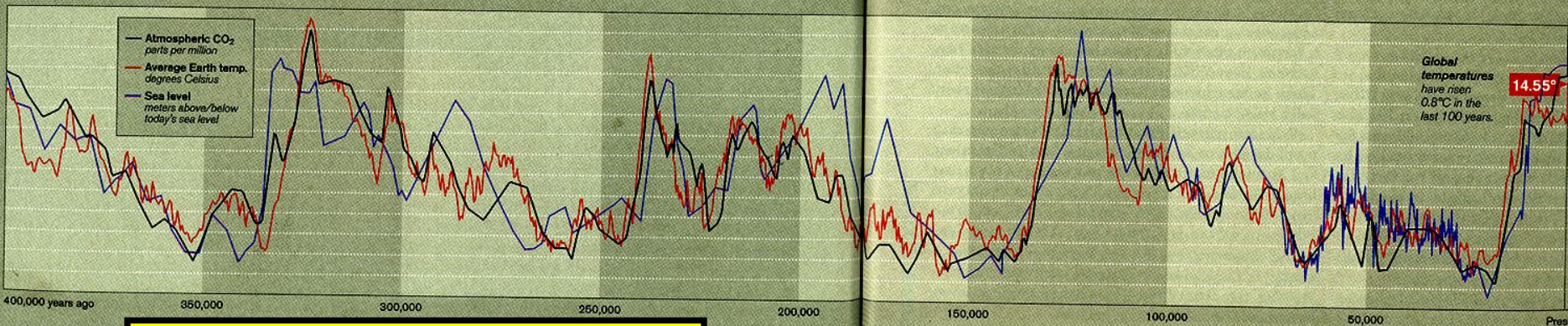
affect the distribution of sunlight, hardly affecting the total amount reaching Earth; yet, scientists believe, this has been enough to set in motion chains of events that raise and lower temperatures, launch and end ice ages, and trigger vast changes in sea level.

What's coming next? Carbon dioxide—the number one greenhouse gas—has

much more power to affect Earth's temperature than the orbital changes do. And in just the past 150 years, humankind has boosted carbon dioxide concentrations by 32 percent. NASA planetary scientist Jim Hansen says that if we continue to increase greenhouse-gas emissions, temperatures will rise between 2 and 3 °C this century, making

Earth as warm as it was three million years ago, when seas were between 15 and 35 meters higher than they are today. His predictions bear weight partly because he can verify his methods: using geological records, he has calculated past temperatures, and his results closely match the measured temperatures shown here. **DAVID TALBOT**

377



See: tinyurl.com/400000years

LY/AUGUST 2006

TECHNOLOGY REVIEW JULY/AUGUST 2006

MIT's *Technology Review*, July/August, 2006

A WORLD 4°C WARMER

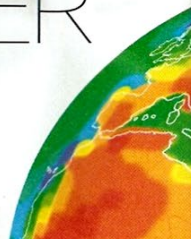
It may happen in our lifetime. **Shanta Barley** investigates what life will be like

BY 2055, climate change is likely to have warmed the world by a dangerous 4°C unless we stop pumping greenhouse gases into the atmosphere the way we do now. This is the startling conclusion of a study by the UK Met Office, unveiled at a conference in Oxford this week.

Why so soon? Because temperature rises caused by greenhouse gas emissions are expected to trigger dangerous feedback loops, which will release ever increasing amounts of greenhouse gases. The nature and scale of these feedback loops is a subject of vigorous debate among climate scientists, but warmer oceans, for instance, may liberate more

dissolved CO₂, and plants may decay faster in a warmer climate. The Met Office ran 17 different models with these feedbacks. All concluded a 4°C world by 2055 was likely if emissions continue to rise. Even if we are lucky, we are still likely to hit 4°C by 2070.

Institute for Climate Impact Research, Germany. Even the less pessimistic estimate of a 0.65-metre rise by 2100 would put at least 190 million people a year at risk from floods, says Rahmstorf's colleague Jochen Hinkel.



**Then in 2009,
TWO DIFFERENT
CLIMATE GROUPS:
SAME PREDICTION**

The Amazon - gone

In a 4°C world, climate change, deforestation and fires spreading from degraded land into pristine forest will conspire to destroy over 83 per cent of the Amazon rainforest by 2100, according to climatologist Wolfgang Cramer at the Potsdam Institute for Climate Impact Research in Germany. His climate models show global warming alone

Why yours 130 c confe increa 15°C of the Califo rise b Stefa

The Nation

Washington Post, 9/25/09, p. A4

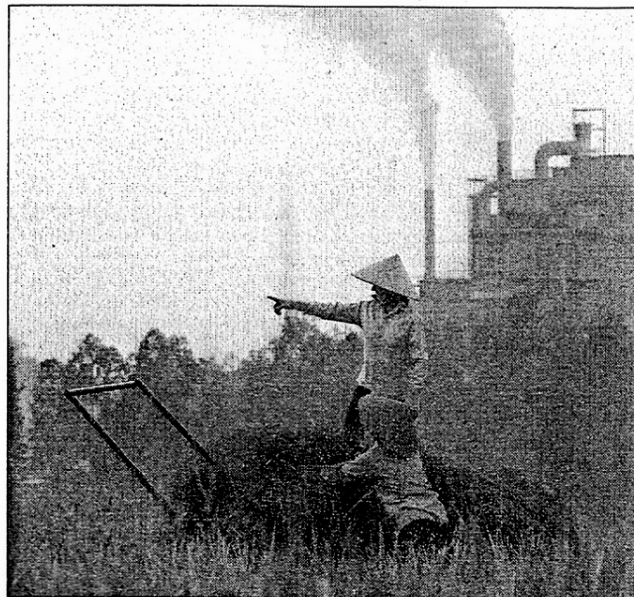
New Analysis Brings Dire Forecast Of 6.3-Degree Temperature Increase

By JULIET EILPERIN
Washington Post Staff Writer

Climate researchers now predict the planet will warm by 6.3 degrees Fahrenheit by the end of the century even if the world's leaders fulfill their most ambitious climate pledges, a much faster and broader scale of change than forecast just two years ago, according to a report released Thursday by the United Nations Environment Program.

The new overview of global warming research, aimed at marshaling political support for a new international climate pact by the end of the year, highlights the extent to which recent scientific assessments have outstripped the predictions issued by the Nobel Prize-winning U.N. Intergovernmental Panel on Climate Change in 2007.

Robert Corell, who chairs the Climate Action Initiative and reviewed the UNEP report's scientific findings, said the significant global temperature rise is likely to occur even if industrialized and de-

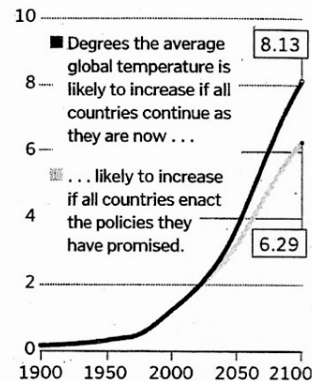


Farmers are overshadowed by a smoke-belching cement factory outside Hanoi. Even with sharp emissions curbs, temperatures may rise disastrously.

Warming Trend

Researchers say global temperatures as likely to rise more than six degrees by the end of the century even if every country enacts all climate legislation it has promised to enact to date.

Temperature increases, in degrees Fahrenheit



SOURCE: Sustainability Institute

THE WASHINGTON POST

PRIZE FIGHT
Time to revamp
the Nobels

News

WEEKLY October 3 - 9, 2009

**Future
Earth**

New Scientist, 10/3/09

Linear Global Temperature Correlation to Carbon Dioxide Level, Sea Level, and Innovative Solutions to a Projected 6°C Warming by 2100

Thomas F. Valone

Integrity Research Institute, Beltsville, USA.

DOI: 10.4236/gep.2021.93007 **PDF** **HTML** **XML** **3,489** Downloads **13,636** Views

[Citations](#)

Abstract

Too many climate committees, conferences, articles and publications continue to suggest a one and a half (1.5°C) to two degrees (2°C) Celsius as an achievable global limit to climate changes without establishment of any causal link to the proposed anti-warming mechanism. A comprehensive review has found instead that observationally informed projections of climate science underlying climate change offer a different outlook of five to six-degree (5°C - 6°C) increase as "most accurate" with regard to present trends, climate history and models, yielding the most likely outcome for 2100. The most causative triad for the present warming trend from

CO₂ and the "Ornery Climate Beast"

How might today's human-caused increases in atmospheric concentrations of carbon dioxide and other greenhouse gases change the planet? The past provides clues. Geological records show that in the past 400,000

years, atmospheric concentrations of carbon dioxide, average Earth temperature, and sea levels have risen and fallen roughly in tandem, in 100,000-year cycles paced by oscillations in Earth's orbit. These osc

Global CO₂ Level in 2024

420 ppm

Sea Level Gap

Temp Gap: 6°C (10°F)

Baseline:

0 m Sea Level = 290 ppm CO₂ = 15°C World Temp

- Atmospheric CO₂ parts per million
- Average Earth temp. degrees Celsius
- Sea level meters above/below today's sea level

Global temperatures have risen 0.8°C in the last 100 years.

14.55°C

CO₂, Temp, Sea Level inextricably correlated historically for 400 kY always in lockstep

400,000 years ago 350,000 300,000 50,000 years ago Present

Break in graph

FEATURE STORY
Technology Review, July/August 2006

Projected Sea Level Rise is 80 meters

KEY to graph: 20 ppm = 1°C = 20 meters

See: tinyurl.com/400000years

Graph enhancements by Thomas Valone, PhD, PE updated 2024



Nat Geo “Six Degrees Could Change the World” documentary

[Climate change](#)

United Nations • Climate change refers to long-term shifts in temperatures and weather patterns. Human activities have been the main driver of climate change, primarily due to the burning of fossil fuels like coal, oil and gas.

Six degrees could change the world



Stephan Nitz
112 subscribers

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700



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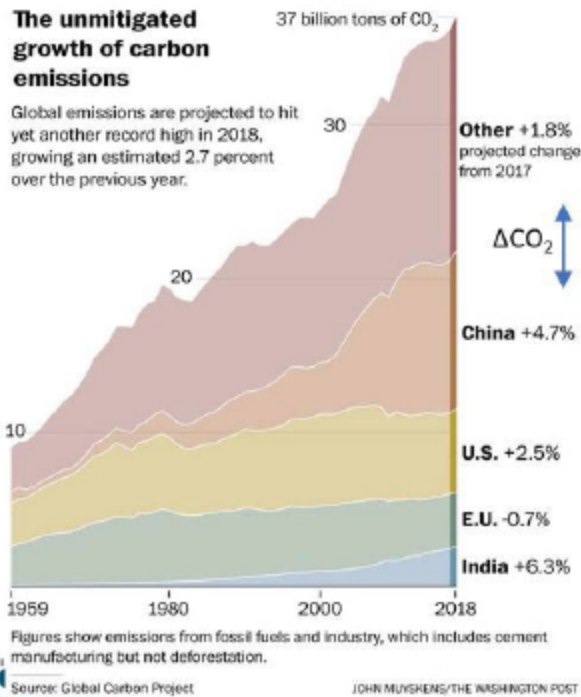


112K views 8 years ago

The film runs through the effect each degree in temperature change has on the world. ...more



IEEE ISTAS 2019 **CARBON EMISSIONS** PER ANNUM



- CO₂ up to 40 gigatons per year worldwide rapidly **increasing rate**
- compared to 30 Gt/yr ten years ago

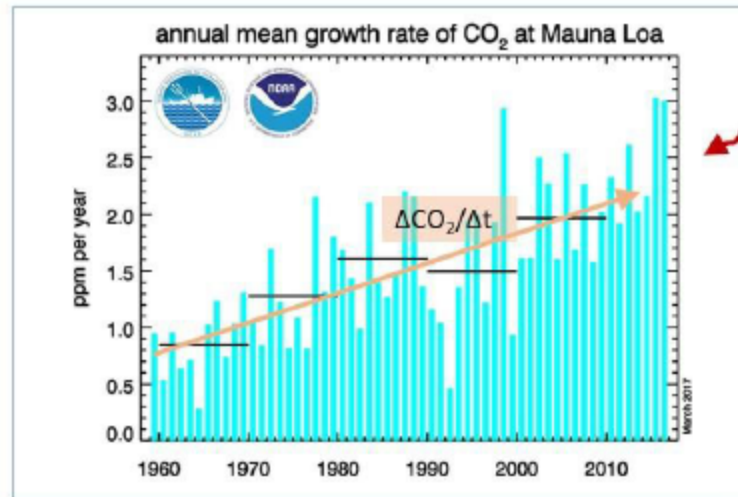


Fig. 2. Rate of change for CO₂ emissions per year [4]



Why Do We Need Carbon Removal?

Climate change ·
Climate change refer...

Why we need carbon removal to address the climate crisis



Analysis by the National Academy of Sciences (NAS) and Intergovernmental Panel on Climate Change (IPCC) shows that deployment of carbon removal is critical to achieve U.S. and global emissions reduction targets by 2050. Even with rapid investment in emission reductions, the United States could need to remove about 2 gigatons of CO₂ per year by midcentury to reach net-zero — that's about 30% of U.S. 2019 greenhouse gas emissions. Globally, scientists predict that up to 10 GtCO₂ will need to be removed annually from the atmosphere by 2050, with increased removal capacity up to 20 GtCO₂ per year by 2100.

Dan Lashof, Dir. World Res. Inst.

Gigaton CO₂ Removal



Anu Khan (She/Her) · 3rd

Science & Innovation at Carbon180

United States · [Contact info](#)

500+ connections



John Kerry's Climate Warning: 'Even If We Get To Net Zero, We Need Carbon Removal'

HuffPost

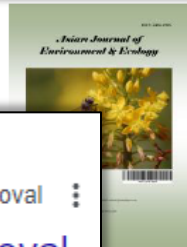
About

Reformed electrochemist working at the intersection of technology, policy, equity, and justice to bring the carbon removal sector to gigaton scale.

Integrity Res. Inst. wants to help save the world by advocating Gigaton Carbon Dioxide Removal (CDR) or Direct Air Capture (DAC). Will billionaires and Congress help?

Denmark has decided to move ahead with the Greensand carbon capture and storage pilot project in the Danish North Sea. The pilot targets the first offshore injection by late 2022. (CREDIT: Creative Commons)

As early as 2005, carbon capture and storage was identified by the UN's Intergovernmental Panel on Climate Change (IPCC) as one of the solutions for tackling climate change. So why aren't we going full steam with carbon capture?



Asian Journal of Environment & Ecology

Volume 20, Issue 2, Page 42-58, 2023; Article no.AJEE.97404
ISSN: 2456-690X

XPRIZE Foundation

<https://www.xprize.org> > prizes > carbonremoval

\$100M Prize For Carbon Removal

This four-year global competition invites innovators

Gigatonne Carbon Dioxide Removal Can Reverse Global Heating Trend

Research Open

Geology, Earth and Marine Sciences

Volume 4 Issue 3

Thomas F. Valone^{a*}

..., Suite. 209, Beltsville MD 20705, US.

Author's contribution

interpreted and prepared the manuscript.

Article Information

DOI: 10.9734/AJEE/2023/v20i2436

Research Article

Direct Air Capture and Removal of Gigatons of CO₂ Offers Hope for Climate Recovery


Thomas F. Valone PhD*

Using the Oceans to Help Capture Carbon > How can the deep blue seas fight climate change best?

BY PRACHI PATEL | 15 AUG 2023 | 5 MIN READ | 

Alkalinity Generation Constraints on Basalt Carbonation for Carbon Dioxide Removal at the Gigaton-per-Year Scale

Benjamin M. Tutolo*, Adedapo Awolayo, and Calista Brown

 Cite this: *Environ. Sci. Technol.* 2021, 55, 17.

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Atlantic Council

<https://www.atlanticcouncil.org> > [blogs](#) > [energysource](#) 

Gigaton carbon removal and the Paris Climate Agreement

May 14, 2021 — **Gigaton-scale removal**, capture, and storage technologies will be



This large-scale Captura facility, shown in an artist's rendering, could capture gigatons of carbon dioxide dissolved in ocean water. CAPTURA CORP.

Scientists Turned Carbon Dioxide into Oxygen by Zapping It with a Laser



SCIENTIFIC REPORTS

CHEMICAL CONVERSION

WEATHERING OF ROCK WASHES ALKALINE MOLECULES INTO THE OCEAN, THEREBY CONVERTING DISSOLVED CO₂ INTO BICARBONATE AND CARBONATE FORMS

Disintegration of Carbon Dioxide Molecules in a Microwave Plasma Torch

Air Capture Summit

News | 06.04.2023



Vesta Earth

<https://www.vesta.earth> > approach

The Approach

From Pilot Project to Gigaton-scale CO₂ Removal.

CO₂ in Denmark's subsurface on March 8, 2023, at the First Carbon Storage event.

Project Greensand
(megaton CDR)

Top contender: **Enhanced Rock Weathering**, proven in Florida 2022 and Halifax Harbor 2023, as low as **\$25/tonne** and up to **15+ billion tonnes/year** (gigatonnes)!

ProjectGreensand.com

partnered with INEOS company for

CDR and DAC

**Capable of reaching 8 million
tonnes of CO₂ per year by 2030**

**Already the first carbon storage
injects CO₂ in 1800 meters below
the North Sea seabed.**



Act now



Support the scale-up of direct air capture

Join our community of forward-thinking Climate Pioneers who are removing CO₂ from the air.

“almost 1000x more effective than trees on the same land”

<https://climeworks.com/subscriptions>

Direct air capture supports nature by scaling CO₂ removal

Trees are critical in the fight against climate change for their ability to remove CO₂ from the atmosphere.





Energy Developments for the Future

WHAT CLEAN ENERGY BREAKTHROUGHS ARE READY TO MAKE A PUBLIC IMPACT?

Nuclear Power, Bacteria-Biomass Electricity,
Solar Electric Plug-in Cars, Lithium-ion
Batteries, Marine Turbines, Moisture Power,
Osmotic Power, Tidal Power, Triboelectricity,
Piezoelectric Panel Power, Distributed Solar
PV, Net Zero Energy Communities, Energy
Harvesting, Long Range Wireless Electricity

Net Zero Energy Districts – Financially Attractive

- (1) Identify on-site **renewable energy capacity** and thus set the district's energy "budget";
- (2) Use **superefficient** district geothermal heating and cooling;
- (3) Set design standards to drive load up to **75 percent below code**; and
- (4) Iterate between steps 1 and 3, optimizing based on the net present value of the life-cycle cost until net zero energy is achieved.

These four steps must be done in a way that makes the project **financially attractive** to developers, tenants, and investors.

Developed for a 180-acre site in a Mid-size US city



BIG IDEA

Buildings that power themselves

Want to glimpse a city of the future? Look no farther than Astana, in oil-rich Kazakhstan, where a new development is rising to host Expo 2017, a global conference on clean energy. Using solar panels and wind turbines, the 430-acre (174 hectare) campus will produce a quarter of its own electricity, eventually cutting its CO₂ emissions by more than 6,000 tons per year. Its buildings are also designed to be über-sustainable, featuring roofs angled for maximum sun exposure and curved facades that repel snow. "It's not an experiment," says architect Gordon Gill, whose Chicago-based firm conceived the project. "It's real." —Julie Shapiro



World Renewables at 30%

Energy

Renewables hit a record high

Clean energy generated 30 per cent of global electricity for the first time last year

Madeleine Cuff

A RECORD share of global electricity was generated by renewable energy sources in 2023 thanks to the rapid growth of solar and wind power. The year marked a turning point in the transition to low-carbon energy, according to think tank Ember, with coal and gas power on the cusp of a long-term decline.

Green electricity jumped from 29.4 per cent of total generation in 2022 to 30.3 per cent last year, a new high. This was driven by the rapid rollout of wind and solar power, particularly in China. Hydropower and other renewables, such as bioenergy, made up the remainder of this portion of generation.

Solar power is by far the fastest-growing electricity source, increasing its contribution from 4.6 per cent in 2022 to 5.5 per cent in 2023. That is the continuation of



NATURAL STRINGS/SHUTTERSTOCK

China has massively boosted its wind and solar energy capacity

a long-running trend; since 2000, wind and solar power have gone from generating just 0.2 per cent of global electricity to a record 13.4 per cent today.

The share generated by fossil fuels fell from 61.4 per cent in 2022 to 60.6 per cent in 2023, but the amount of electricity produced by these fuels actually rose slightly because of a 2.2 per cent hike in overall demand, mostly in China. Nuclear provided 9.1 per cent of electrical power, the same as it did in 2022.

A further surge in wind and

solar deployment means that, in absolute terms, fossil fuel generation should fall in 2024 – for the first time outside economic crises or pandemics – even as demand for electricity grows, says Ember's Hannah Broadbent.

"We really think that 2023 was a major turning point in the history of energy," she says. "Not only did renewables reach this historic milestone, we also believe that it will be the peak of fossil generation as well. We expect from this year that fossil generation will start to decline at a global level."

Fossil fuel generation would have gone down in absolute terms in 2023, says Broadbent, but severe droughts in China, India, Vietnam and Mexico curtailed hydropower. Coal plants stepped in to fill the gap, leading to a 1 per cent increase in power sector emissions.

Assuming a partial return to normality for hydropower in 2024, Ember says it expects emissions from electricity generation to fall by 4 per cent in 2024, the start of a long-term decline for fossil fuels in the mix.

However, green electricity deployment must increase even more rapidly over the coming

"We really think that 2023 was a major turning point in the history of energy"

years to meet the world's climate goals. Models suggest wind and solar must deliver 40 per cent of global electricity generation by the end of the decade, around triple their current contribution in order to meet the target of stopping global warming exceeding 1.5°C this century.

100% IN 139 COUNTRIES

Transition to 100% wind, water, and solar (WWS) for all purposes
(electricity, transportation, heating/cooling, industry)



Residential
rooftop solar
14.89%



Solar plant
21.36%



Concentrated
solar plant
9.72%



Onshore wind
23.52%



Offshore wind
13.62%

2050

PROJECTED
ENERGY MIX



Commercial/govt
rooftop solar
11.58%



Wave energy
0.58%



Geothermal energy
0.67%



Hydroelectric
4%



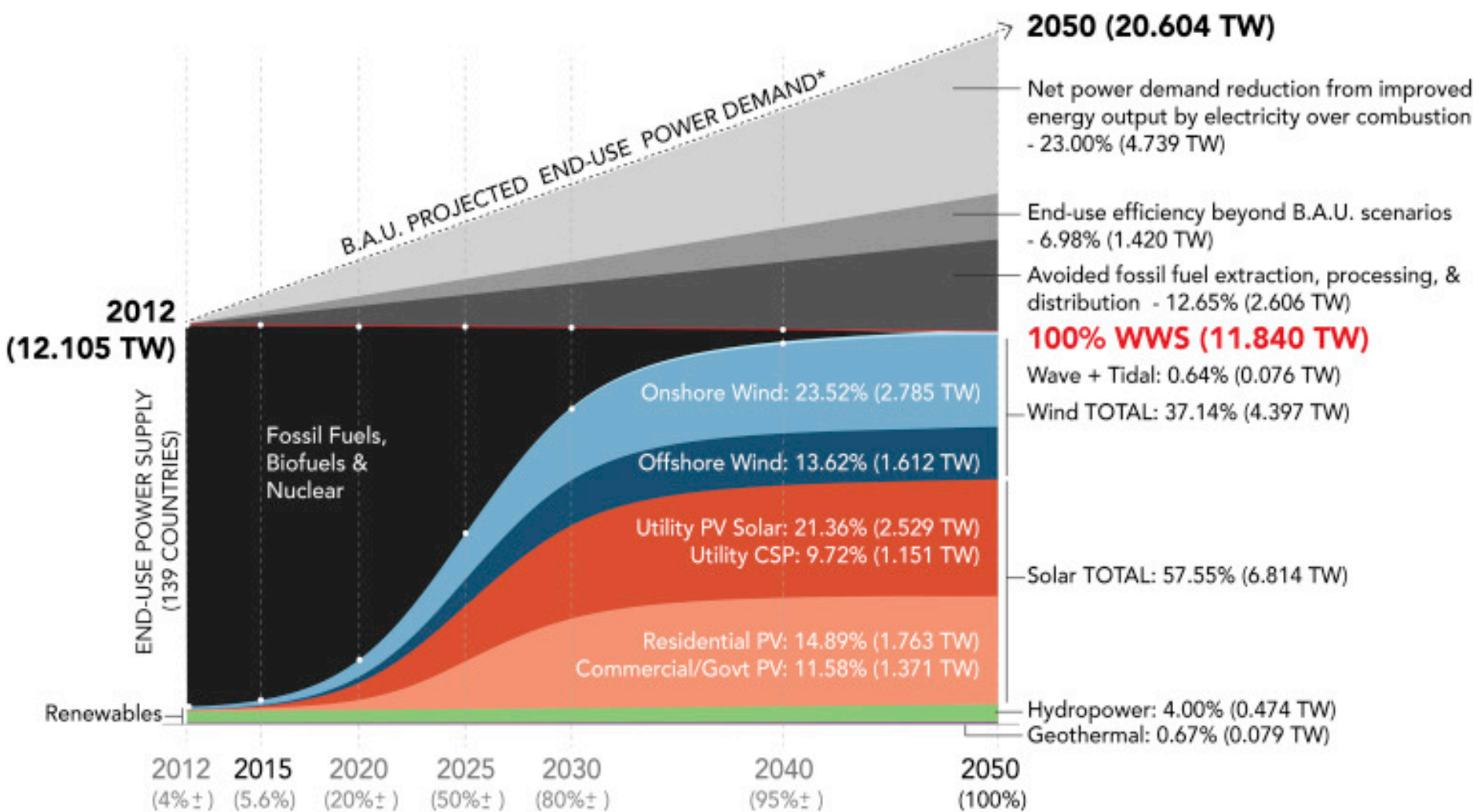
Tidal turbine
0.06%



JOBS CREATED 52 MILLION

JOBS LOST 27.7 MILLION

**Mark Z. Jacobson, director of Stanford University's
Atmosphere and Energy Program – *Joule*, 2017**



Projected Power Supply & Demand, 139 Countries

*ENERGY FOR ALL USES INCLUDING ELECTRICITY, HEATING, TRANSPORTATION, INDUSTRY

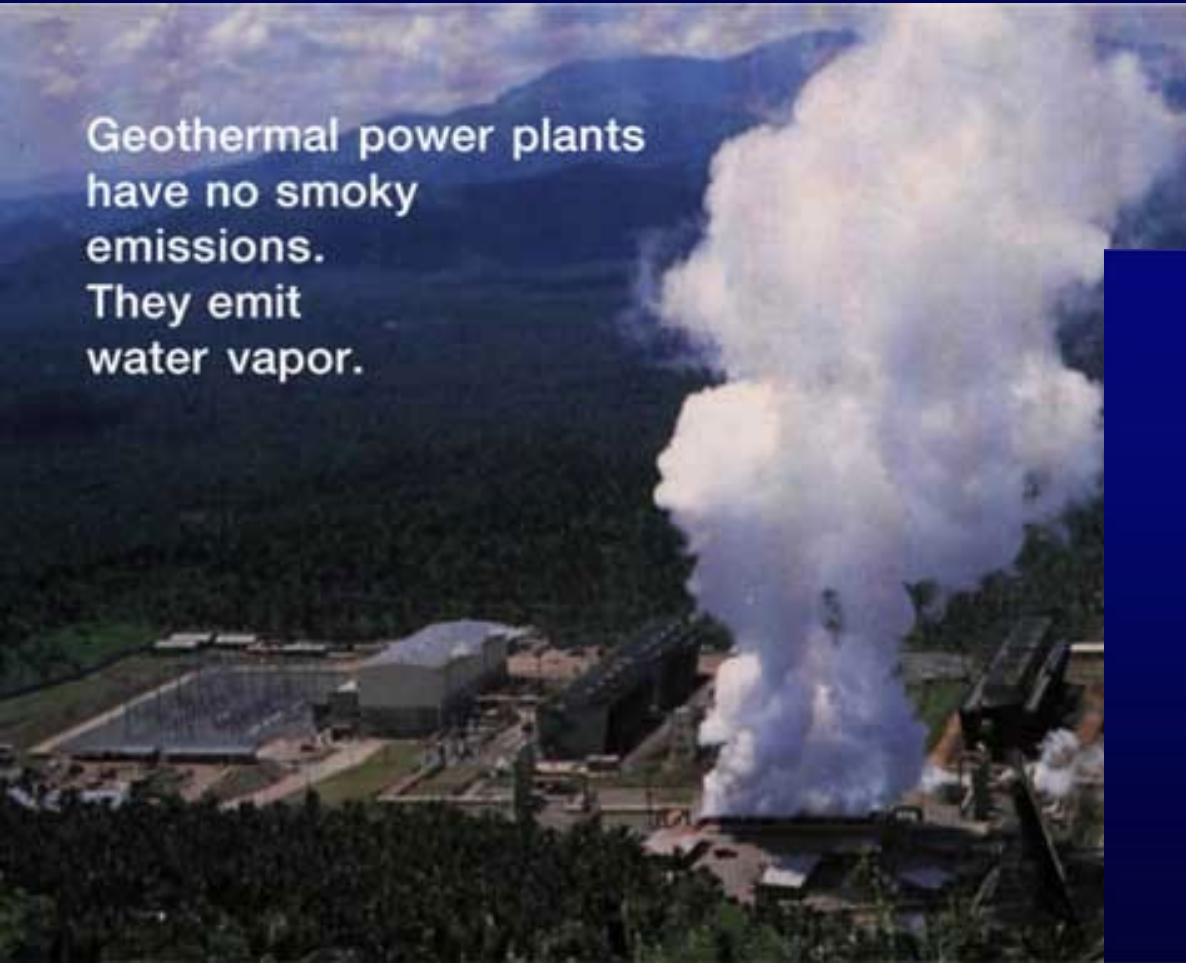
“100% Clean and Renewable Wind, Water, and Sunlight All-Sector Energy Roadmaps for 139 Countries of the World” – *Joule*, V.1, N.1, p. 108, 9/6,17

Thomas Valone - Integrity Research Institute

U.S. Geothermal Power

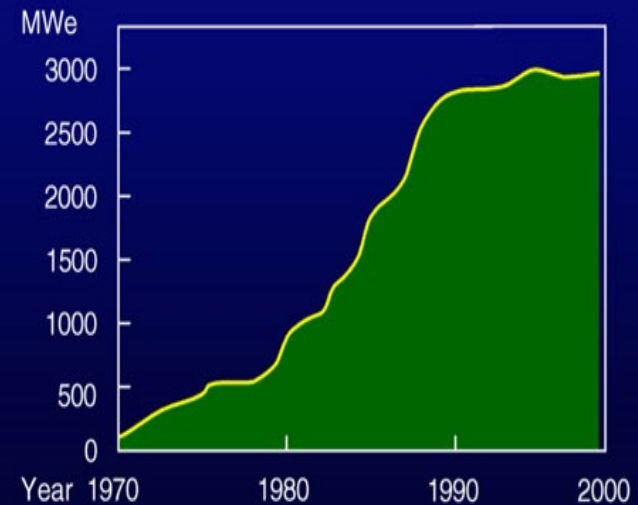
Over 2,800 megawatts of electricity from geothermal power plants are supplying about 4 million people in the U.S.

Geothermal power plants have no smoky emissions. They emit water vapor.



Jan. 22, 2007
MIT Panel Backs Geothermal as a KEY US Energy Source – report: mit.edu

Growth in U.S. Geothermal Power



Topic 2: Breakthrough Energy Technologies Derived from New Paradigm Science

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Iceland drills hottest hole to tap into energy of molten magma



EARTH 21 October 2016

By Fred Pearce



HS Orka
Generated 30 MW
(10X similar geothermal well)

Drilled 5 kilometers down into earth's mantle

ICSG-S2-T2-S Dr. Thomas Valone 15M



Speaker
Dr. Thomas Valone

President, Integrity Research Institute, Beltsville, MD, USA

0:30:16 0:00:00

Speaker icons 10 ▶ 30 ✎ 📄 ↗ ⋮

Caldera Ejecta Volume

in km³ (mi³) DRE*

- 1. Island Park ~2450 (590)
- 2. Henry's Fork ~280 (67)
- 3. Yellowstone ~1000 (240)
- 4. West Thumb ~50 (12)

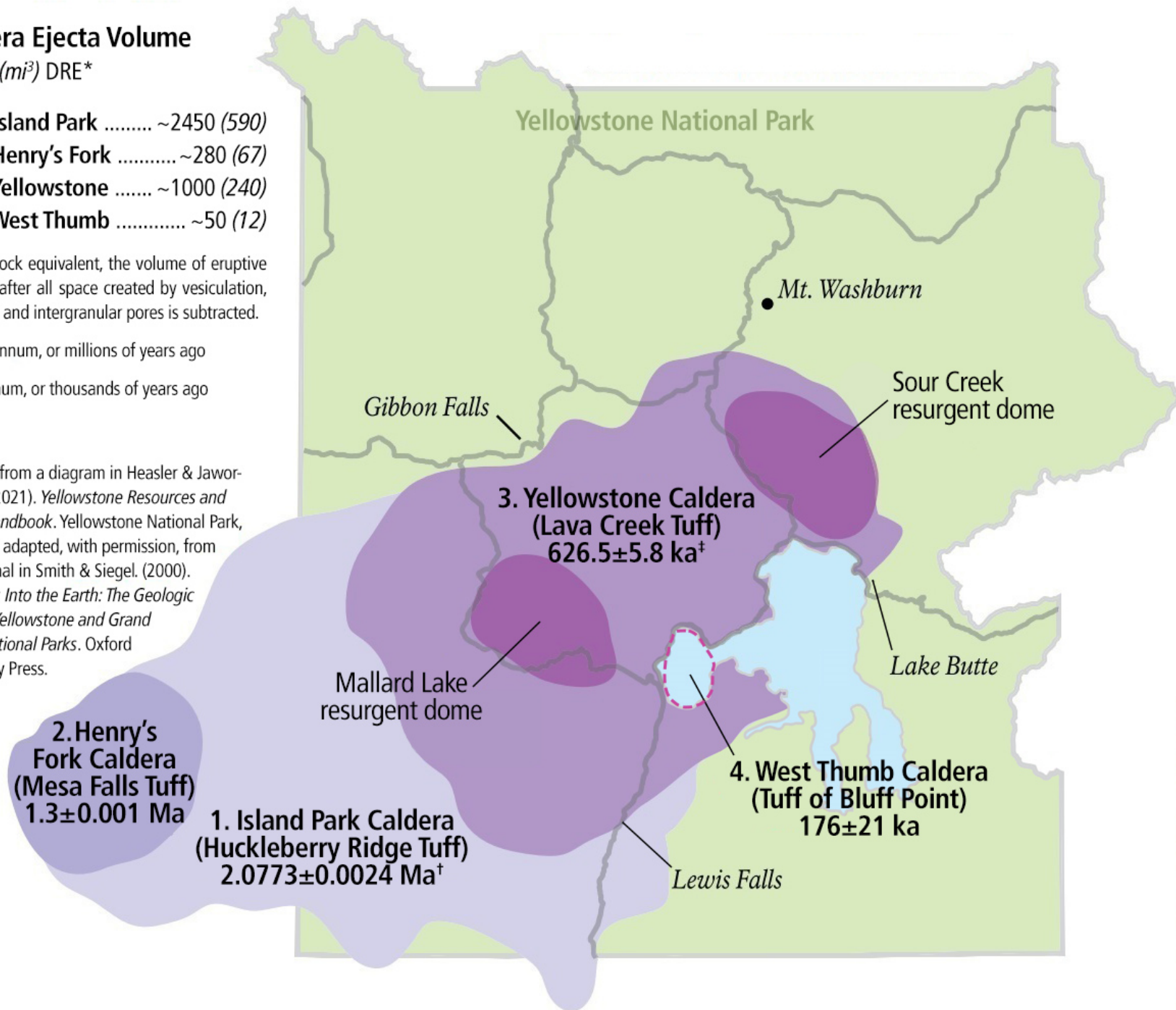
*Dense-rock equivalent, the volume of eruptive material after all space created by vesiculation, fractures, and intergranular pores is subtracted.

†Mega-annum, or millions of years ago

‡kilo-annum, or thousands of years ago

Credits

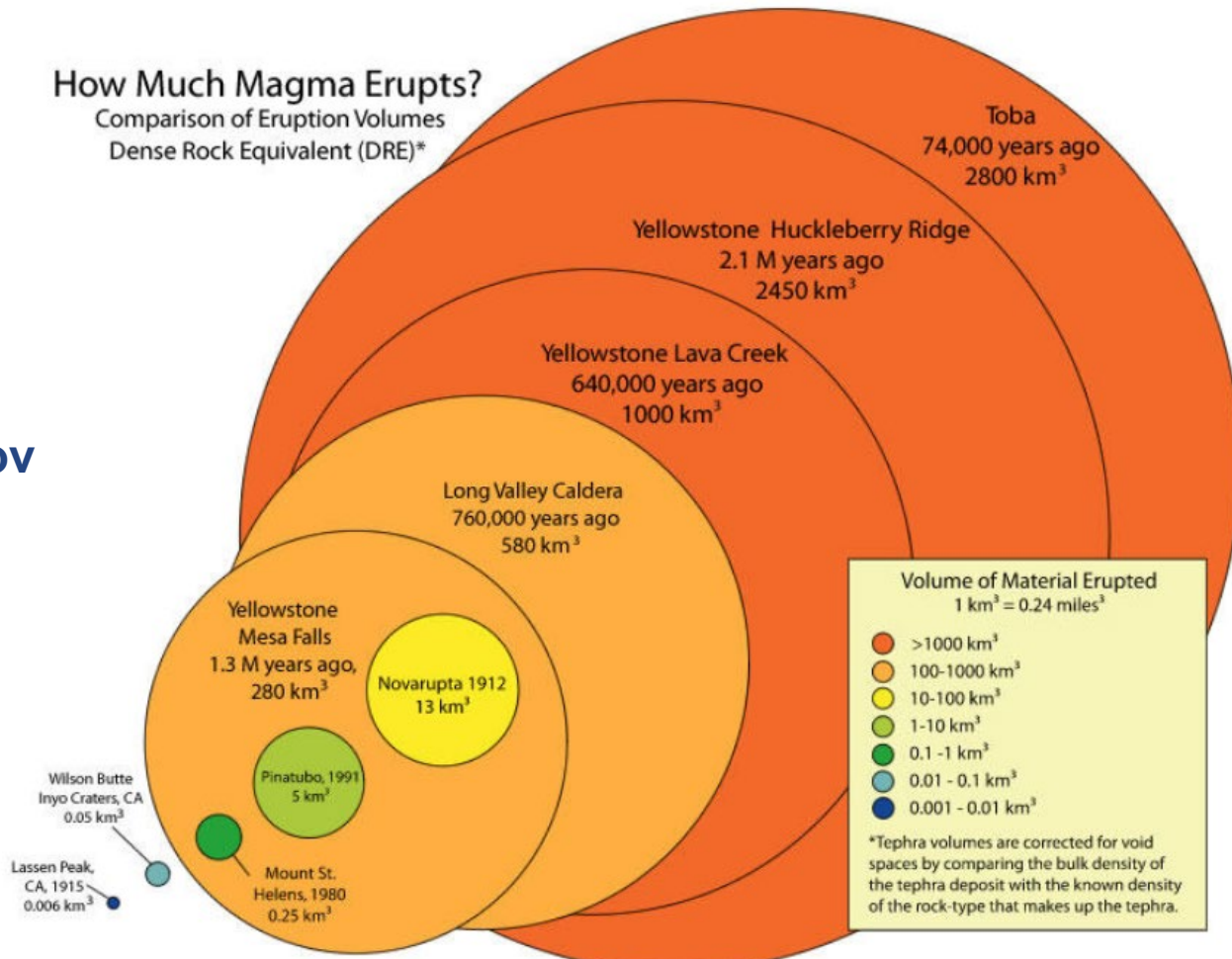
Adapted from a diagram in Heasler & Jaworowsky. (2021). *Yellowstone Resources and Issues Handbook*. Yellowstone National Park, WY, itself adapted, with permission, from the original in Smith & Siegel. (2000). *Windows Into the Earth: The Geologic Story of Yellowstone and Grand Teton National Parks*. Oxford University Press.



LET'S DRILL THE YELLOWSTONE CALDERA FORESTALL THE COMING SUPERVOLCANO ERUPTION

In 2005, [BBC](#) and the [Discovery Channel](#) produced a docudrama and documentary about Yellowstone called *Supervolcano*. Below, Yellowstone

How Much Magma Erupts?
Comparison of Eruption Volumes
Dense Rock Equivalent (DRE)*



Source:
[USGS.gov](#)

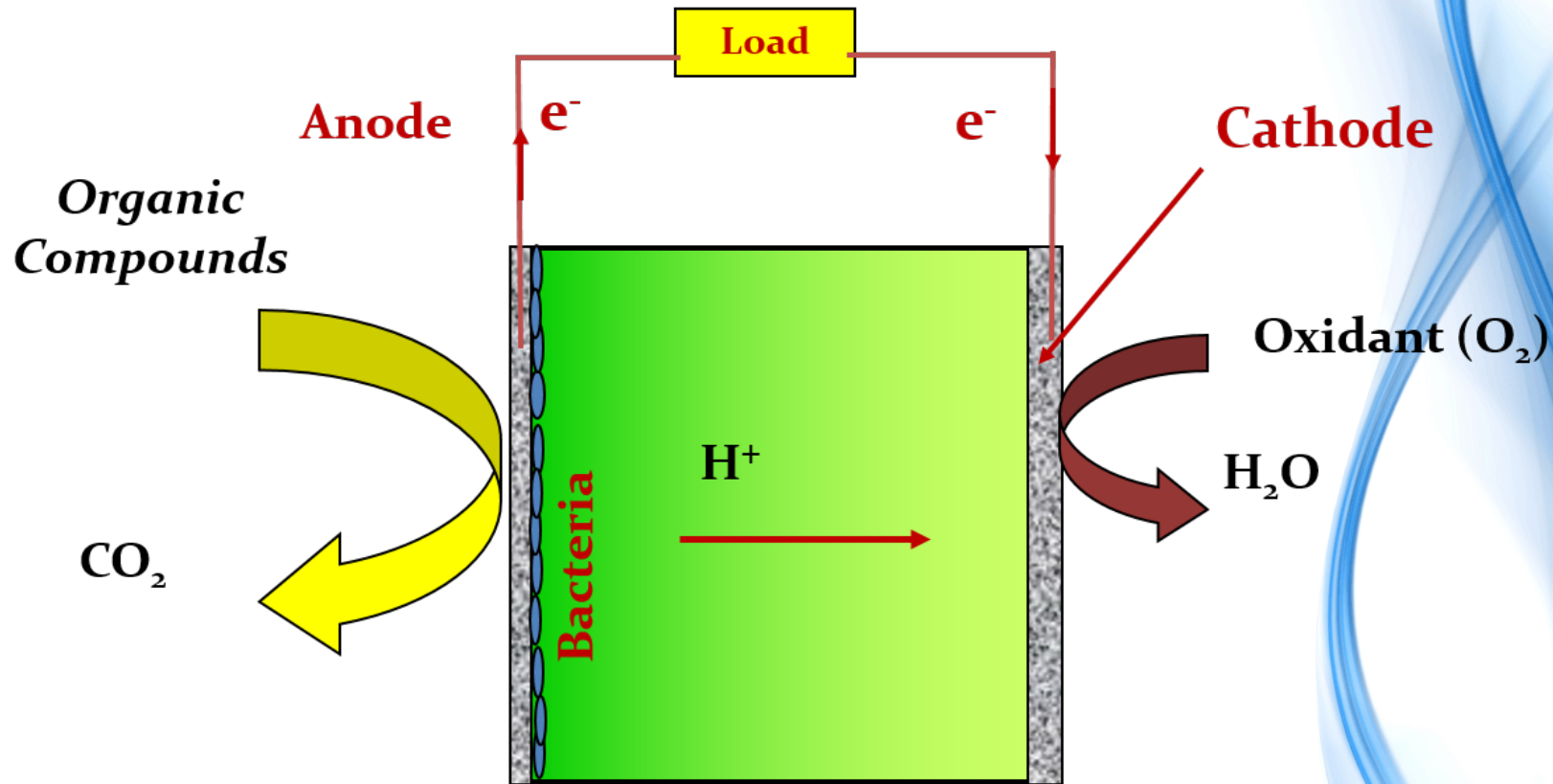
Bacteria made to turn sewage into clean water – and electricity

A self-powered waste water treatment plant using microbes has just passed its biggest test, bringing household-level water recycling a step closer



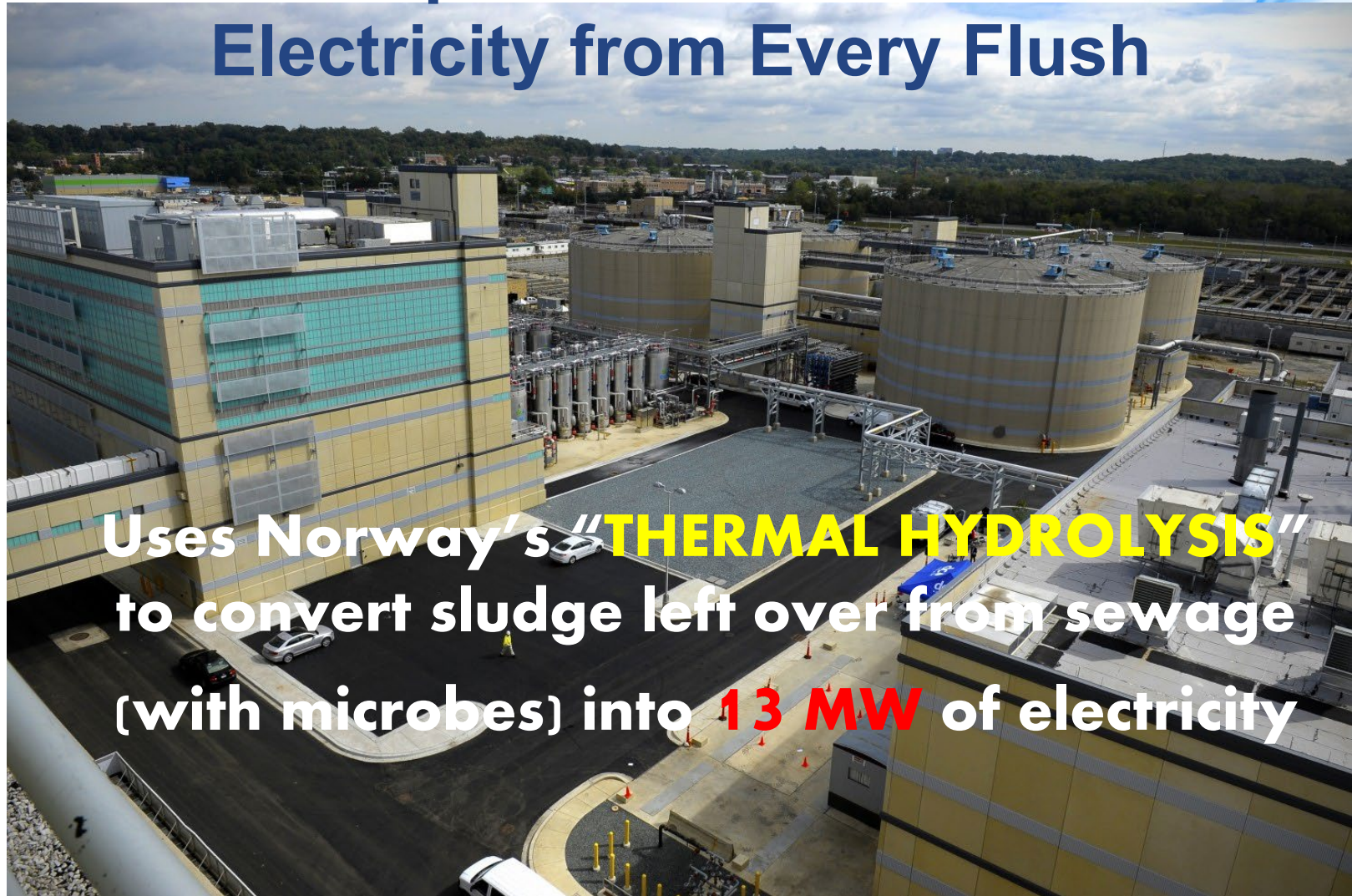
BioVolt microbial fuel cell uses GMO *Geobacter* strains which generate electricity, grow slowly and do not create microbe cake – **Cambrian Innovation** tested at Naval Surface Warfare in MD –
®scaling up from 2000 liters/day to 20,000 liters/day

BACTERIA GENERATE ELECTRICITY AND PURIFY WASTE WATER



Also Craig Venter Institute testing 600 liters/day pig waste at local farm in Escondido CA and Penn State University generates kilowatts from human waste

Nation's Capital **D.C. Water** Harnesses Electricity from Every Flush



Uses Norway's "**THERMAL HYDROLYSIS**" to convert sludge left over from sewage (with microbes) into **13 MW** of electricity

Dairy farms are a big market since only four current use digesters out of hundreds of farms that use digesters
– Dr. Lansing

SOLAR ENERGY MODULES



Solar Illuminations lamp
8 hours light with solar



Select Language

NO KEROSENE="NOKERO"



Inflatable Solar Light
\$15 from MPOWERD.COM



Distributed electricity that is failure-proof:

- solar lanterns
- networked solar rooftops

Thomas Valone - Integrity Research Institute





ISTOCK, AUDIOUNDWERBUNG



NEWS

Floating Solar Panels Could Power Entire Countries

While promising, further research into floating photovoltaics is needed

Article | [Open access](#) | Published: 04 June 2024

Decarbonization potential of floating solar photovoltaics on lakes worldwide

[R. Iestyn Woolway](#) , [Gang Zhao](#), [Sofia Midauar Gondim Rocha](#), [Stephen J. Thackeray](#) & [Alona Armstrong](#)

[Nature Water](#) (2024) | [Cite this article](#)

June, 2024, *Nature Scientific Reports*

FPV Study by UK Hydrology of 68,000 lakes and reservoirs projects **TWh potential** and 73% reduction in irradiance on lake surface, reducing evaporation and water temperature. Popular in Europe.

SOLAR ELECTRIC VEHICLES

Solar-Powered Vehicle Market Report Scope & Overview:

The **Solar-Powered Vehicle Market** Size was valued at USD 1.27 Billion in 2023 and is expected to reach USD 6.05 Billion by 2031 and grow at a CAGR of 21.5% over the forecast period 2024-2031.

Solar vehicles are electric vehicles that get their propulsion from the sun in the form of solar energy rather than traditional fossil fuels. Photovoltaic cells, which are mounted in the solar

SOLAR-POWERED VEHICLE MARKET



www.snsinsider.com/reports/solar-powered-vehicle-market-1809

Aptera.us
solar-powered
EV, range of 40
miles →

Solar-powered car travels **80 km (50 miles)** on a **5 to 6 hour charge** in the sun.

ELECTRIC COMMERCIAL AIRLINERS



CHEETA

Center for Cryogenic
High-Efficiency
Electrical Technologies
for Aircraft

- U of Illinois for
NASA

Fully electric aircraft platform using cryogenic liquid hydrogen

“The hydrogen chemical energy is converted to electrical energy through a series of fuel cells, which drive the ultra-efficient electric propulsion system.” -- Prof. Phillip Ansell

NASA is providing \$6 million over the course of three years.

[Home](#) > [Green](#) > [Green News](#)

World record: Wind turbine generates enough energy in a day to power 170,000 homes

384 MWh in 24 hours
252-meter diameter
Southeast China, 2023



AQUANTIS BUILDING UNDERSEA TURBINES



With turbines already in production and being **distributed to Wales and the Isle of Wight in 2018**, the start of something big. Soon after the first turbines have been erected, the biggest is at a site in the **Gulf Stream in 2020** and consists of a **200 MW field of marine turbines**. **Department of Energy grants have already been awarded to the team, and even Mitsubishi Heavy Industries has claimed a little piece of investment.**

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Energy Harvested from Evaporation Could Power Much of U.S., Says Study

September 26, 2017



Sci. Amer. 313,
26, Aug. 2015
**Toy car runs
on the
energy of
evaporation**

ENERGY OF EVAPORATION

Harvard Univ. and
Columbia Univ.

HOW IT WORKS

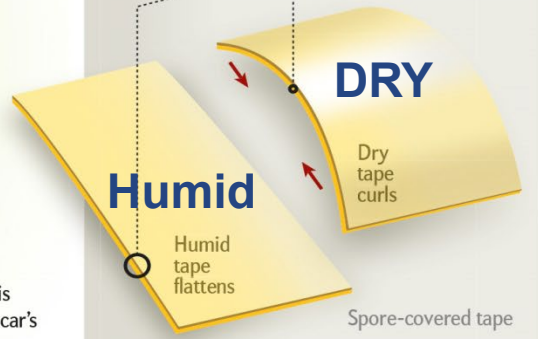
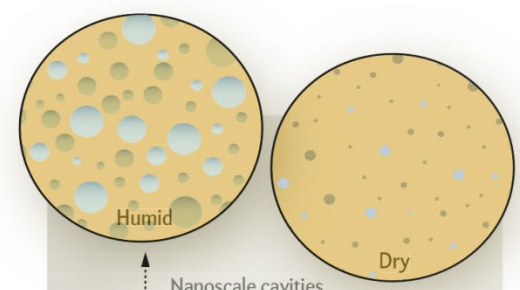
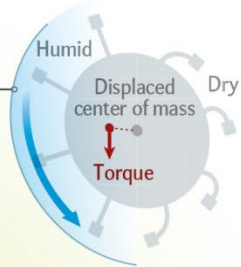
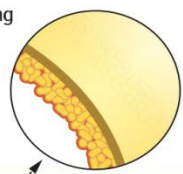
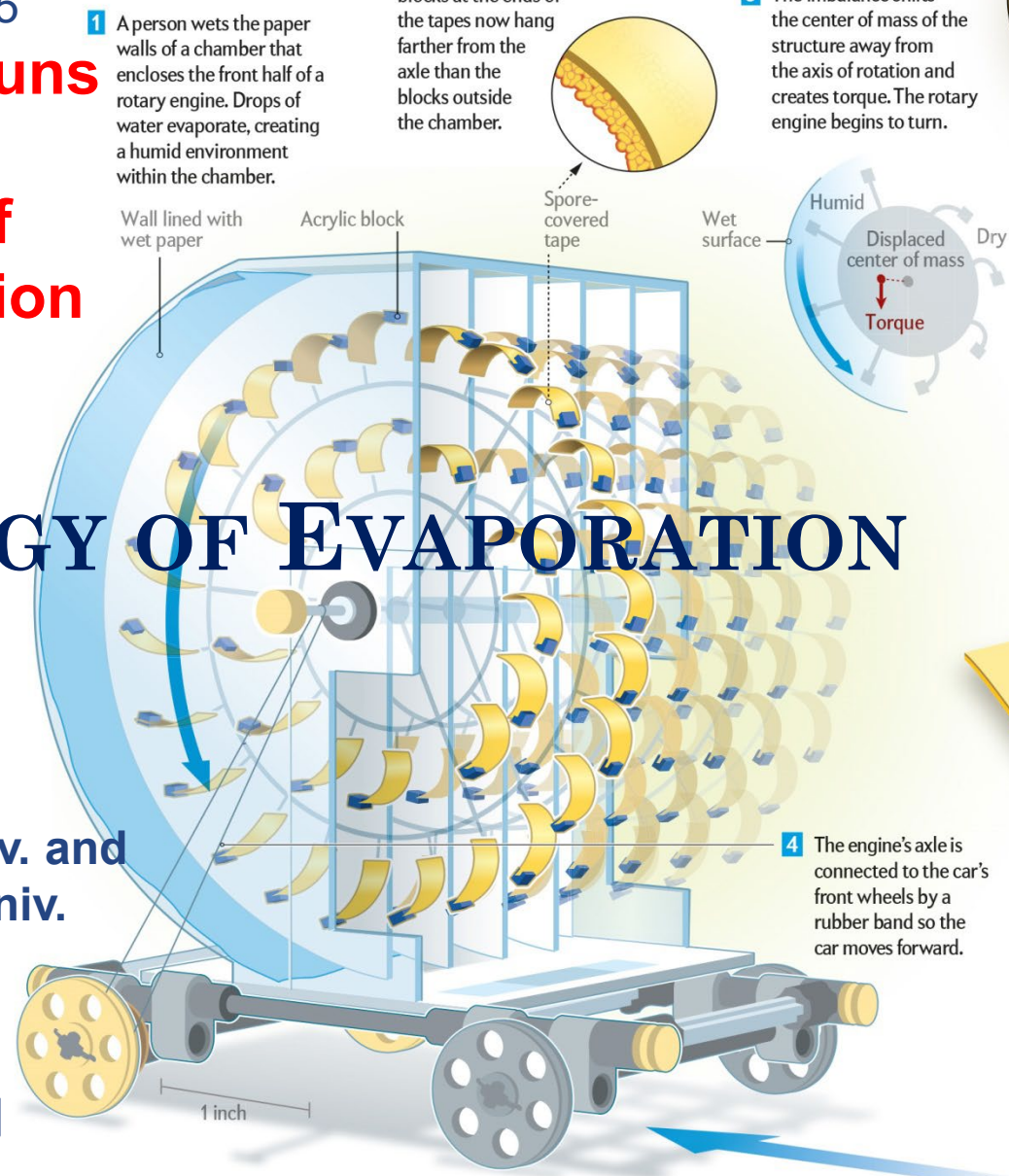
1 A person wets the paper walls of a chamber that encloses the front half of a rotary engine. Drops of water evaporate, creating a humid environment within the chamber.

2 Bacterial spores on plastic tapes inside the chamber absorb the moisture and expand, causing the tapes to lengthen. Small, acrylic blocks at the ends of the tapes now hang farther from the axle than the blocks outside the chamber.

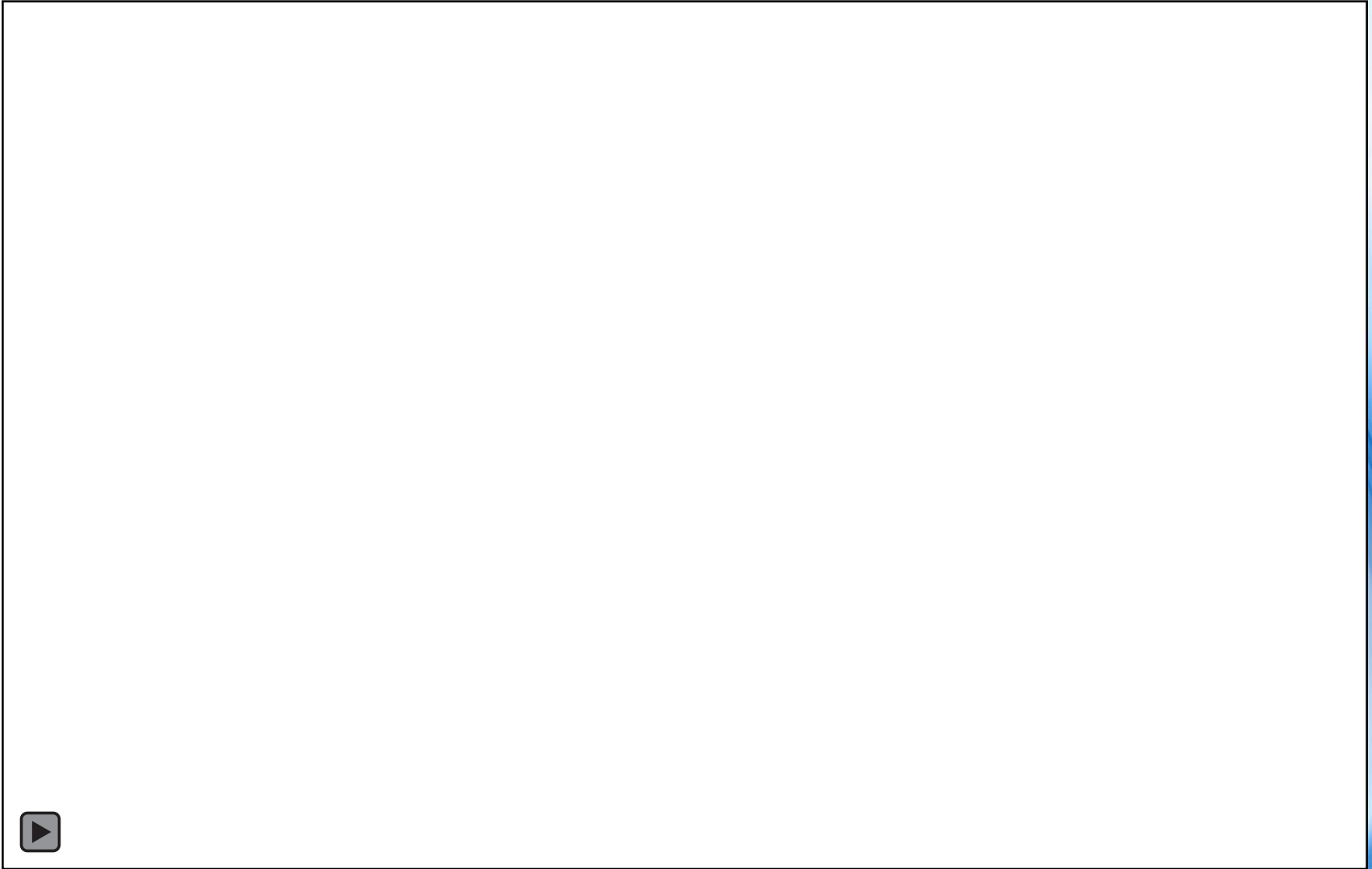
3 The imbalance shifts the center of mass of the structure away from the axis of rotation and creates torque. The rotary engine begins to turn.

4 The engine's axle is connected to the car's front wheels by a rubber band so the car moves forward.

5 When the tapes inside the chamber emerge into the dry air, their spores release water and shrink. As a result, the tapes curl up and pull their blocks closer to the axle—maintaining the off-kilter center of mass. The wheels stop turning when all the water has evaporated.



DUAL GYRO CAR – CONF. ON FUTURE ENERGY



IRI sponsored Electric Propulsion Project
<https://tinyurl.com/GambleCMG>

(19) **United States**

(12) **Patent Application Publication**
Jenkins

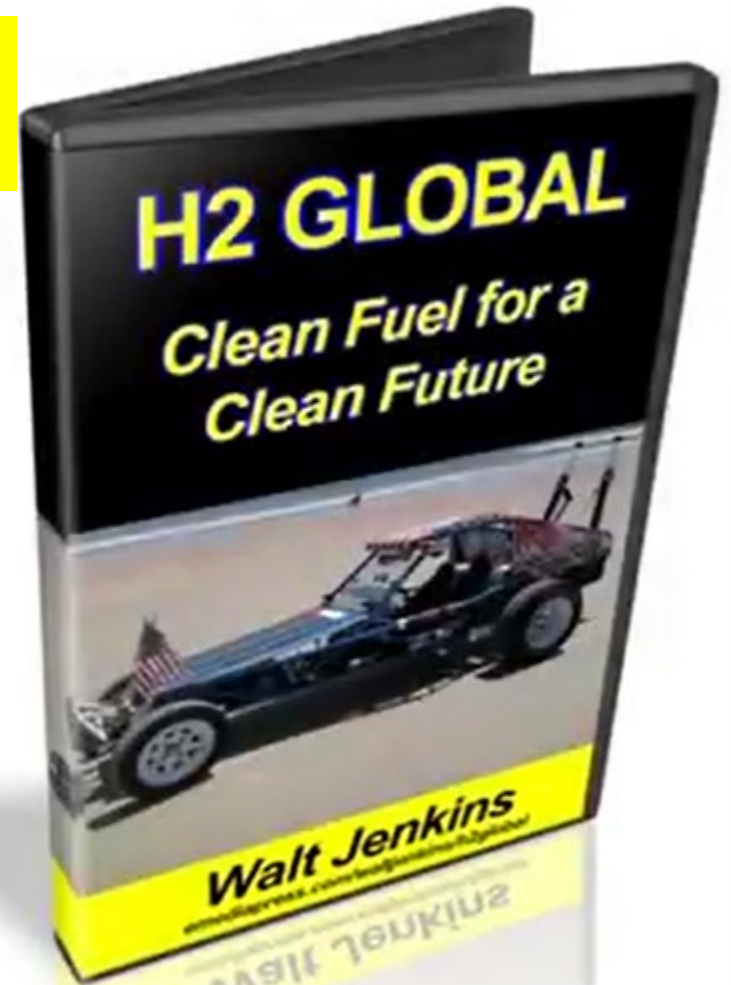
(10) **Pub. No.:** US 2012/0186557 A1

(43) **Pub. Date:** Jul. 26, 2012

Apparatus, system, and method for vaporizing fuel mixture

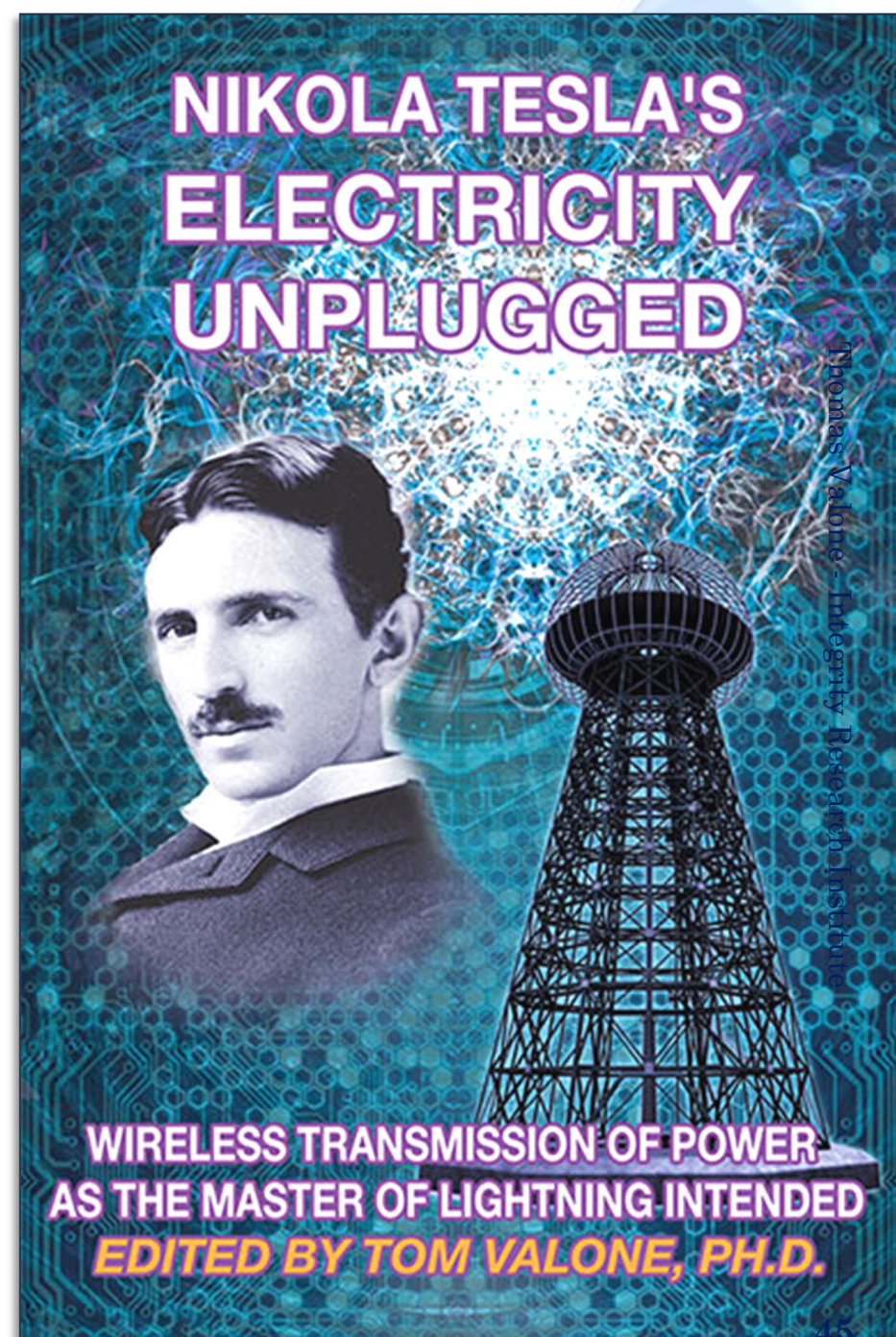
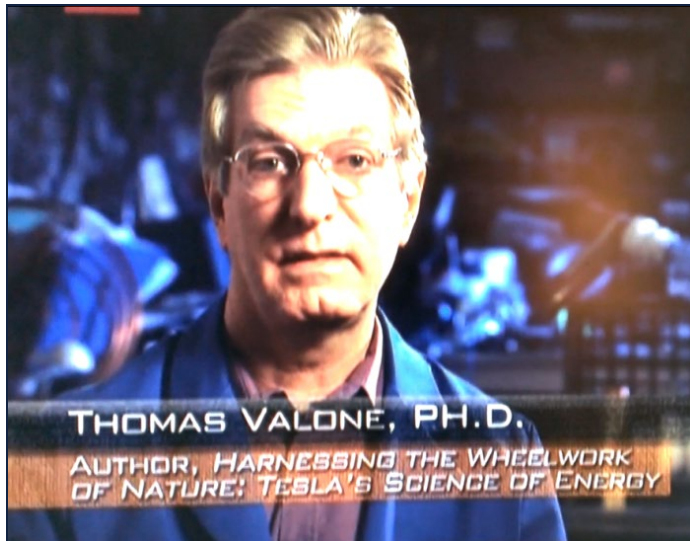
[0038] In one embodiment, the piezoelectric material is selected according to an ability to vibrate at a frequency in the range of between about 0.5 to 5.0 MHz. In a further embodiment, the piezoelectric material is selected according to an ability to vibrate at a frequency in the range of between about 1.6 and 3.0 MHz. In this embodiment, the oscillating discs 220 generate water/fuel particles having an ideal size for combustion. Generally, the higher the frequency of the oscillating discs, the smaller the size of the water/fuel particles. The ideal size particle may depend on various engine parameters including, engine displacement, and combustion technology. In one embodiment, the particle size may be in a range of about 2 microns or less. In one embodiment, the

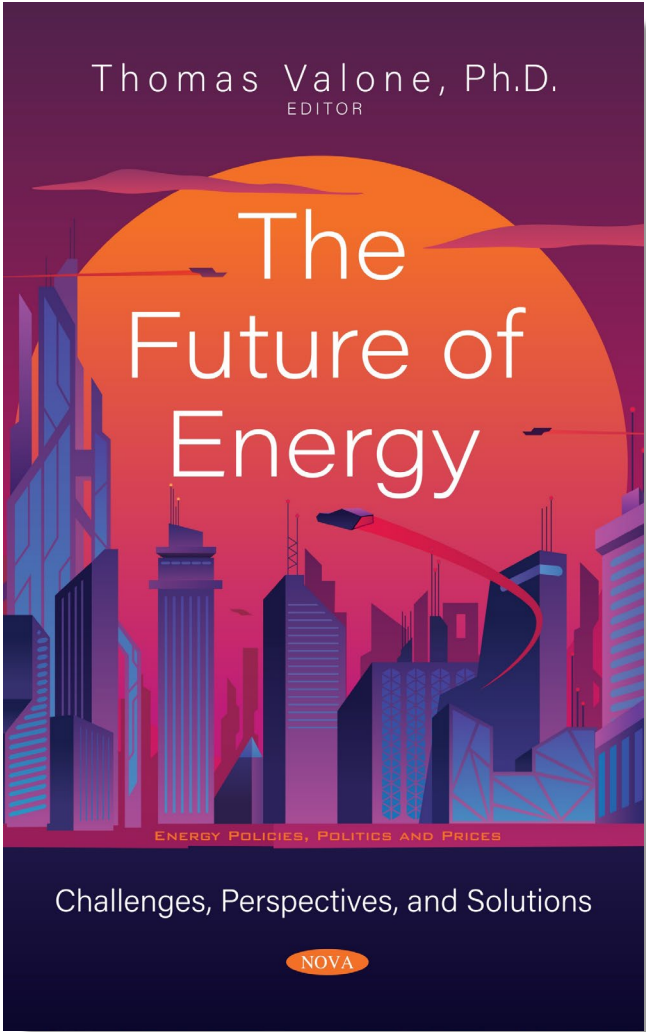
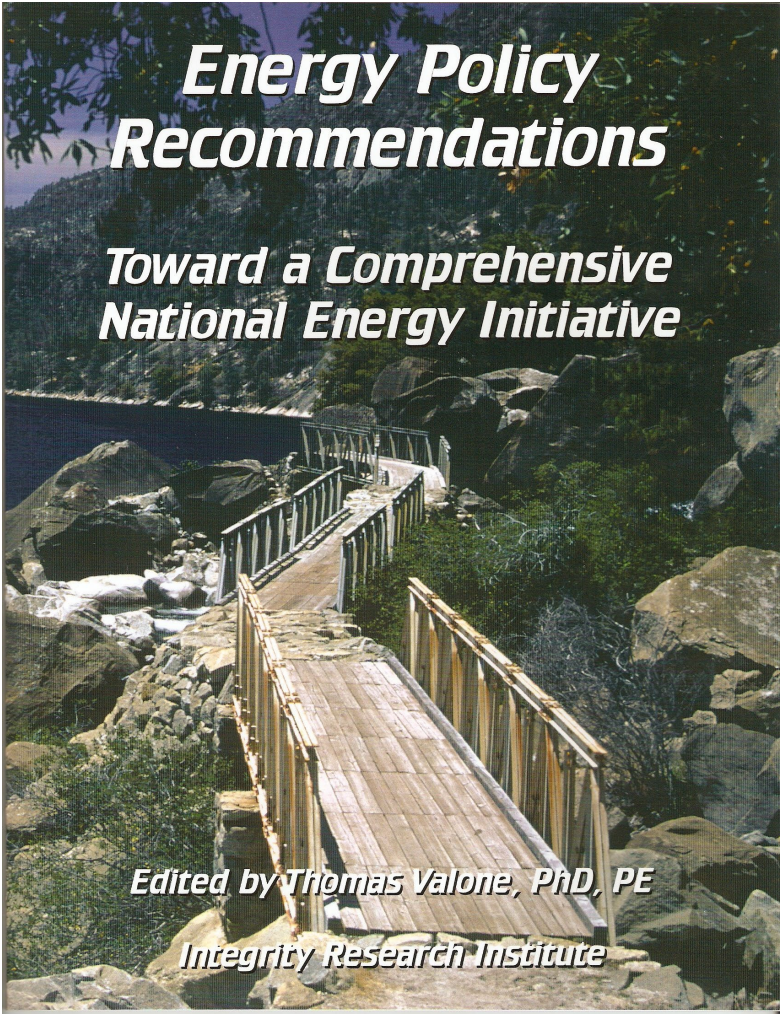
Piezoelectric vibrates at 0.5 to 5.0 MHz to make micron-sized vaporized fuel mixture with mostly water and little fuel.



WIRELESS POWER BECOMES AVAILABLE

From short range to long range, the latest wireless solutions are in a 450-page illustrated book → Long range wireless power transmission uses Zenneck Surface Waves, being demonstrated by Texzon Technologies (Texzont.com)



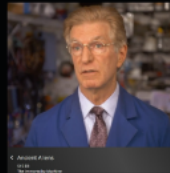


Modern Meditation Technique

Full color Companion Book to the one-hour **Modern Meditation Training Seminar** on YouTube, before a live audience at US Patent & Trademark Office www.tinyurl.com/ModernMeditation

This Modern Meditation Technique has been taught by this author regularly, on a quarterly basis, at the US Patent and Trademark Office and as an annual seminar at a Natural Living Expo in Washington DC, as well as at other organizations like the American

practices. The practice of meditation can begin with a simple attempt to try it occasionally and only eventually let it evolve into a daily habit.



Dr. Thomas F. Valone is an author and editor of several books including most recently, *The Future of Energy* (Nova Science Pub. 2020), as well as over 100 articles. Dr. Valone has lectured widely at government and organizational venues. He is President of Integrity Research Institute and formerly a physics teacher at Erie Community College. He has appeared on CNN, A&E, History and Discovery Channels, Coast to Coast AM, and Gaia TV. Dr. Valone has been a speaker for the Whole Person Healing Conference, World Future Society and others.

ISBN 9798864831304



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Modern Meditation Technique

Thomas Valone PhD



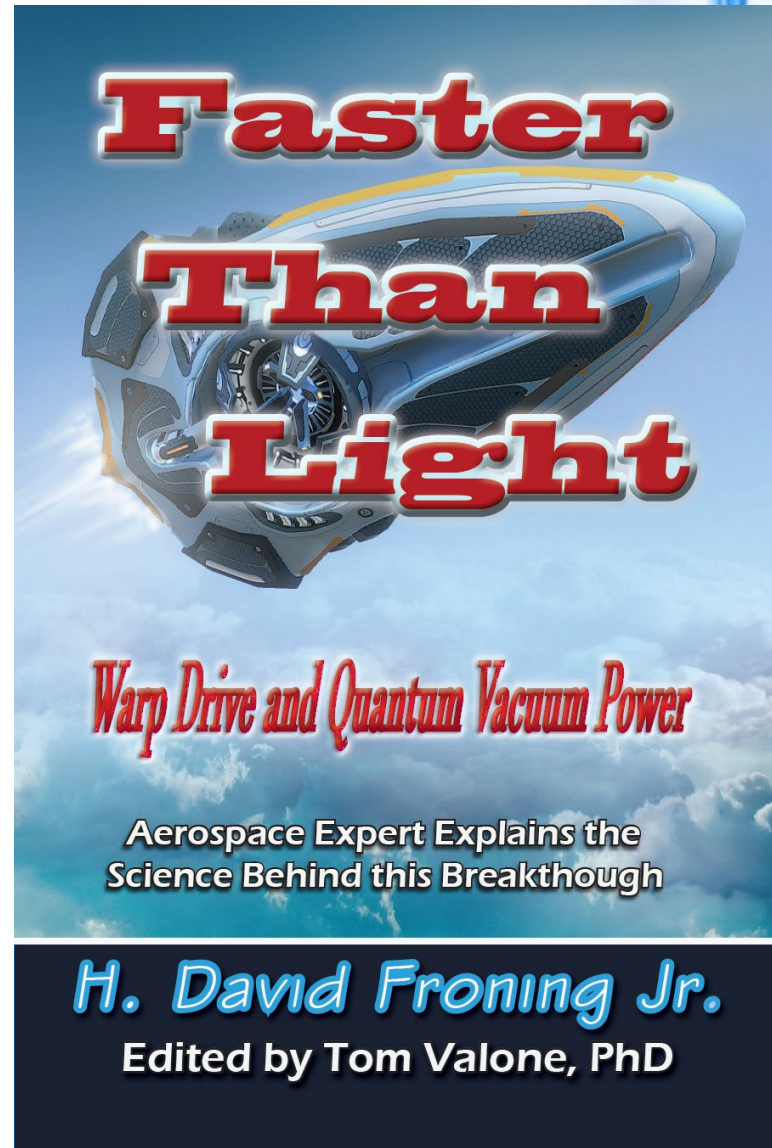
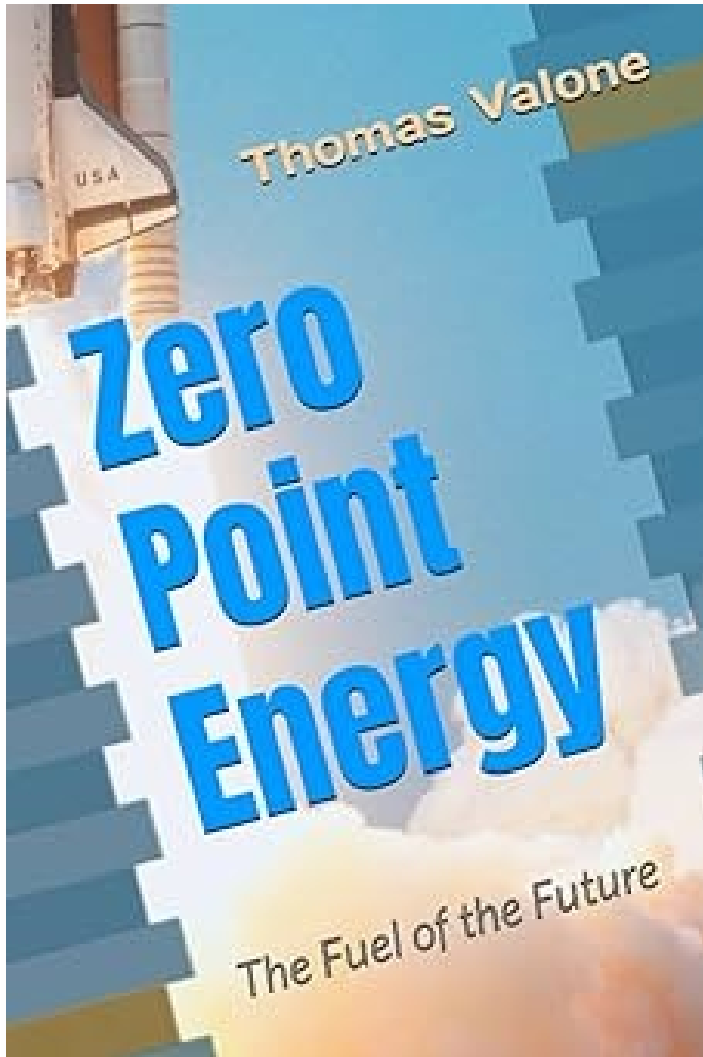
Modern Meditation Technique

Quick Training Guide for Guaranteed Health, Serenity, Success, Harmony, Fulfillment

Thomas Valone Ph.D.

On Amazon

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A close-up photograph of a light blue medical coat. A silver stethoscope with blue tubing is draped over the chest area. A black pen is tucked into the right breast pocket. The background is a soft-focus view of the coat's fabric and buttons.

**Food, Health, and
Drug-Free
Bioelectromagnetics**

The 19 Biggest Companies in Vertical Farming Today



Updated April 2024.

Vertical farming is an exciting industry that seeks to feed our increasingly urbanized population with locally grown produce. It's no wonder then that investors are excited about vertical farming investments. But who are the biggest vertical farming companies in the space? And how can you invest in vertical farming companies' stock?

AeroFarms.com

95% less water!

99% less land!

NO pesticides

Fraction of fertilizer

Year round indoors

Other ones include:

BrightFarms.com

<https://bowery.co>

etc.

This IS the future of farming for feeding the world sustainably

<https://www.edengreen.com/blog-collection/17-biggest-companies-in-vertical-farming>

Quality of Care

How does the quality of the U.S. health system compare to other countries?

By Imani Telesford, Emma Wager ,
Krutika Amin, and Cynthia Cox *KFF*



October 23, 2023

Introduction

Long-Term Health
Outcomes

Despite spending [more money per capita](#) on healthcare than any similarly large and wealthy nation, the United States has a lower life expectancy than peer nations and has seen worsening health outcomes since the onset of the COVID-19 pandemic.

Dr. Glen Gordon
On Electrotherapy
Next slide →

Thomas Valone - Integrity
Research Institute

Magnetic Pulses Regenerate

- Induces expression of HSP 70*
- Quenches inflammation and trauma
- Stabilizes free radical chemistry
- Stimulates the calcium channel transport
- Upregulates growth and restorative genes
- Downregulates dysregulatory genes
- Fast rise time of pulse is the key (dB/dt)



Dr. Glen Gordon is heard here from his DVD, “Speaking of your Injury” on magnetic pulse technology applications and HSP 70

* “Heat Shock Protein and PEMF”, Goodman, Reba. Columbia Univ.

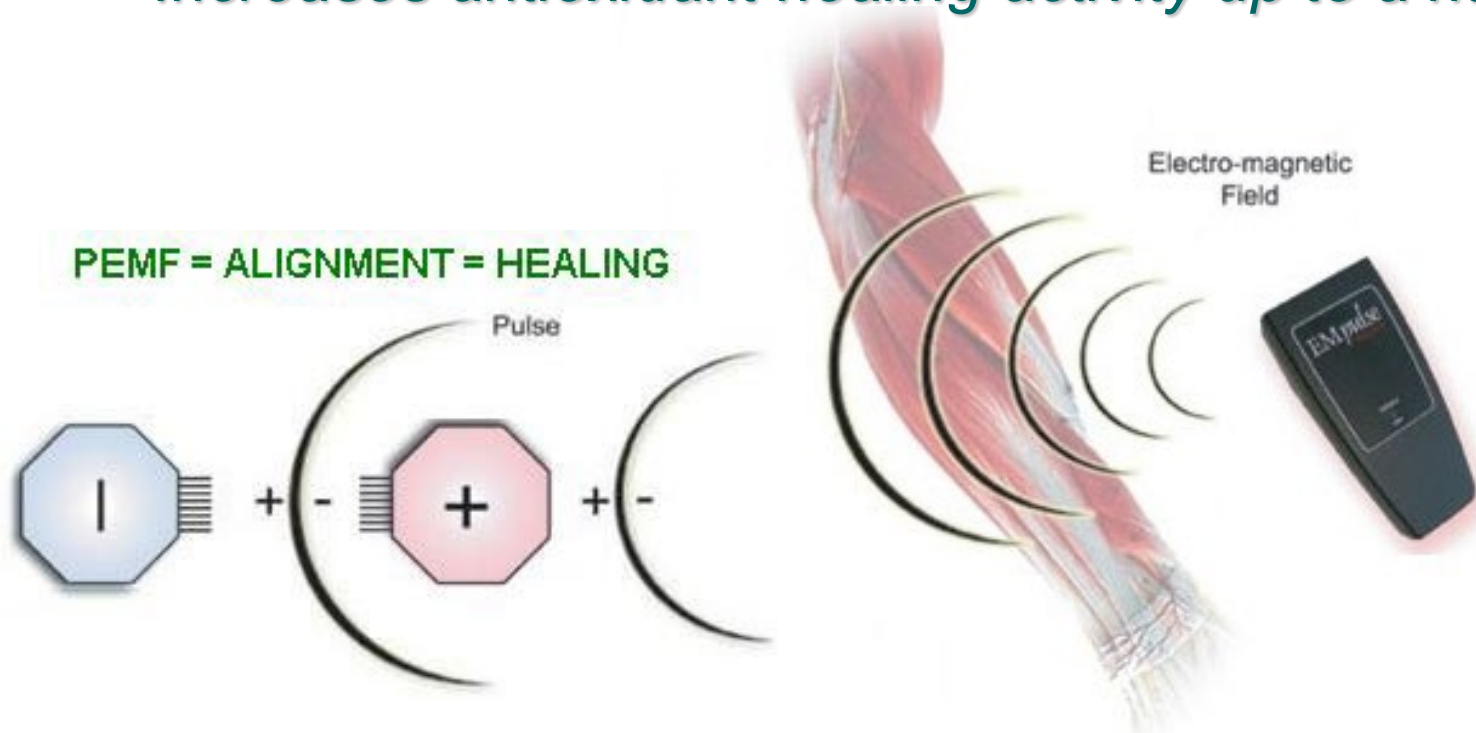


The Solution: Pulsed Electromagnetic Fields

Injury & Disease = Free Radical Event

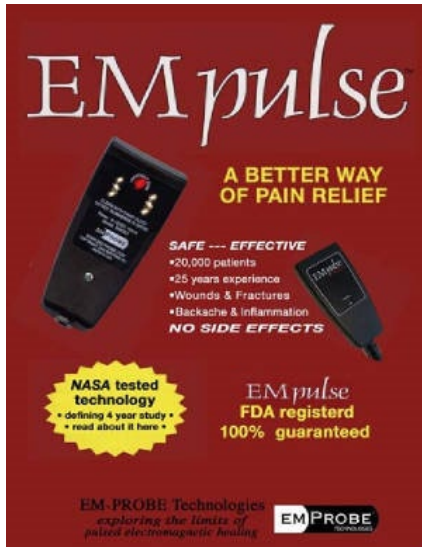
PEMF Increases Neutralization by Antioxidants

Increases antioxidant healing activity up to a hundredfold



Example: fracture healing in 10-12 days instead of six weeks

Dr. Glen Gordon's EMpulse



← Old model

New Model
Developed
By Dr. Valone for
Integrity Research

- Fastest nanosecond rise time on market
- 7.8 Hz pulse rate
- Anti-inflammatory
- Stimulates HSP 70 in just 10 min.
- Upregulates restorative genes



Visit BioEnergyDevice.org

SCIENTIFIC REPORTS

Nature magazine, (2019) 9:1645 | <https://doi.org/10.1038/s41598-018-36341-z>

OPEN

Cardioprotection from stress conditions by weak magnetic fields in the Schumann Resonance band

G. Elhalel¹, C. Price¹, D. Fixler² & A. Shainberg³

The Schumann Resonances (ScR) are Extremely Low Frequency (ELF) electromagnetic resonances

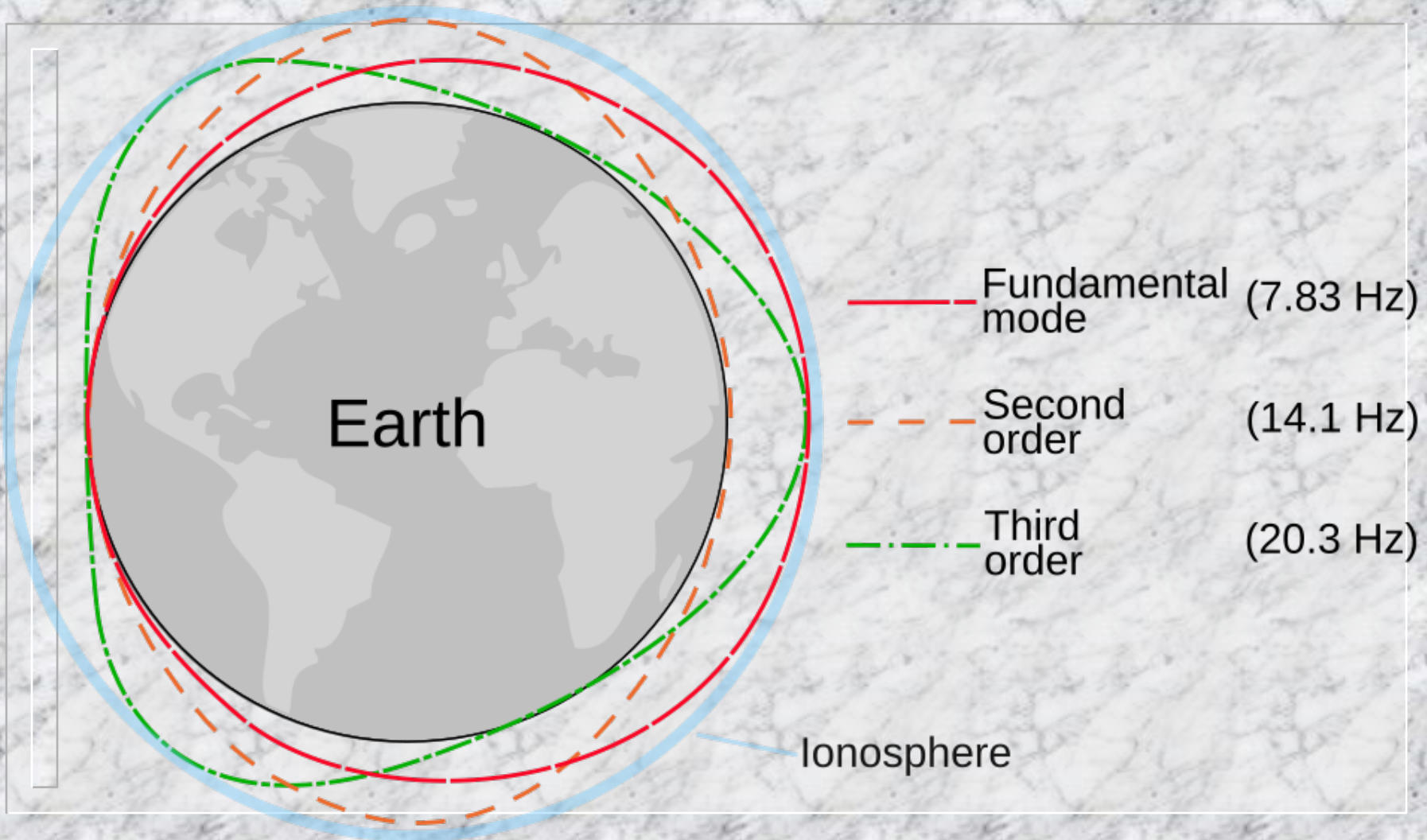
Accepted: 14 September 2018

Published: 19 November 2018

First online: 07 February 2019

Magnetic 90 nT field study. 7.8 Hz +/- 0.2 Hz frequency-dependent decrease in calcium transient after 30 minutes, even while under induced hypoxic stress.

Schumann Resonance 7.8 Hz EMF



Electrons are Antioxidants

FREE RADICALS STEAL ELECTRONS

creating more free radical DAMAGE in a chain reaction (10,000 times) – buy a shower filter for chlorine in city water – powerful free radical

Damaged mitochondrial DNA causes aging

ANTIOXIDANTS STOP FREE RADICALS WITH ELECTRONS

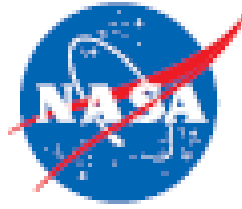
References

- **“Oxidative damage causes aging”** - *Life Enhancement*, Oct. 2004
- “Dying before their time: studies of prematurely old mice hint that DNA mutations underlie aging.” *Science News*, July 10, 2004, p. 26
- “Mice and mitochondria” Martin, *Nature*, 2004, V. 429, p. 357,417

NASA Findings on PEMF

- *NANOSECOND Speed = 2-4 times healing power*
- *PEMF upregulates approx. 150 repair genes*
- *Transforming growth factor-1 - bone*
- *Vascular endothelial growth factor (VEGF) – improves blood vessels*
- *Increases mitochondria 300-400%*
- *Strengthens and protects the heart when under stress*
- ***Antioxidant healing activity up hundredfold***

**“High rising and falling slew rates”
PEMF stimulates
new cartilage growth**



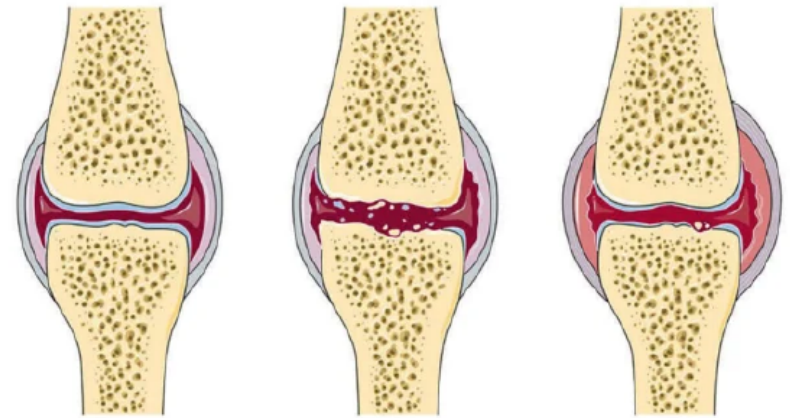
NOVEMBER 1, 2022 | MEDICAL [/ TB / TOPICS / HEALTH-MEDICINE-BIOTECHNOLOGY]

Noninvasive Therapy for Cartilage Regeneration

A device that can alleviate cartilage degradation in synovial joints by promoting the growth of new cartilage.

Johnson Space Center, Houston, TX

Osteoarthritis and rheumatoid arthritis



Normal joint

Osteoarthritis

Rheumatoid arthritis

A comparison of healthy and inflamed synovial joints. (Image: NASA)

Innovators at NASA Johnson Space Center researching time-variance magnetic field (TVMF) therapies have developed a pulsed electromagnetic field (PEMF) device that can alleviate cartilage degradation in synovial joints by promoting the growth of new cartilage.

“Frequencies were generally low...from 6 Hz – 500 Hz”

Health Medicine And Biotechnology

**Noninvasive Therapy for Cartilage Regeneration
(MSC-TOPS-96)**

Magnetotherapy can restore damaged joints

Ask a Question

Apply to License

(12) **United States Patent**
Goodwin et al.

(10) **Patent No.:** **US 8,795,147 B1**
(45) **Date of Patent:** **Aug. 5, 2014**

(54) **MODIFYING THE GENETIC REGULATION OF BONE AND CARTILAGE CELLS AND ASSOCIATED TISSUE BY EMF STIMULATION FIELDS AND USES THEREOF**

7,179,217	B2	2/2007	Goodwin et al.	
7,456,019	B2	11/2008	Goodwin et al.	
2006/0229487	A1*	10/2006	Goodwin et al.	600/13
2007/0105769	A1*	5/2007	Simon	514/12
2008/0138415	A1*	6/2008	Hussain et al.	424/486
2009/0234417	A1*	9/2009	Pastena et al.	607/40
2011/0105959	A1*	5/2011	O'Connor	601/2

(75) Inventors: **Thomas J. Goodwin**, Houston, TX (US); **Linda C. Shackelford**, Webster, TX (US)

OTHER PUBLICATIONS

(73) Assignee: **The United States of America as represented by the Administrator of the National Aeronautics and Space Administration**, Washington, DC (US)

Au et al in "Interactive effects of surface topography and pulsatile electrical field stimulation on orientation and elongation of fibroblasts and cardiomyocytes" (Biomaterials: 2007, vol. 28, No. 29, pp. 4277-4293).*

Patents 8,795,147 9,896,681 10,724,030

OsteoPad.org

Designed to Restore Cartilage & Bone

Three models:
OsteoPad **Original**
14" x 20",
OsteoPad **MiniMat**
10" x 36"
and
OsteoPad **MaxiMat**
14" x 60"



OsteoPad **MaxiMat** is 5 feet long and about 14" wide

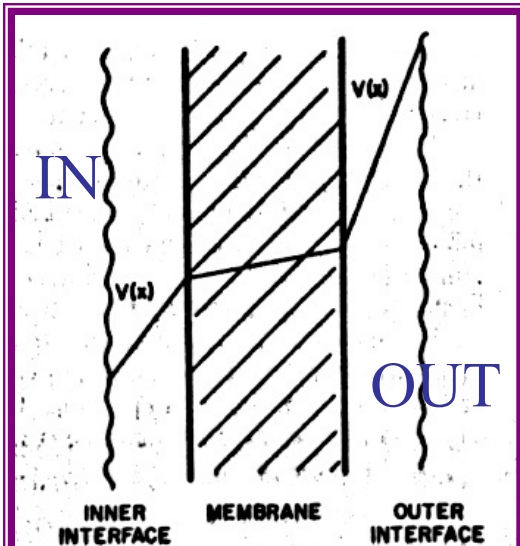
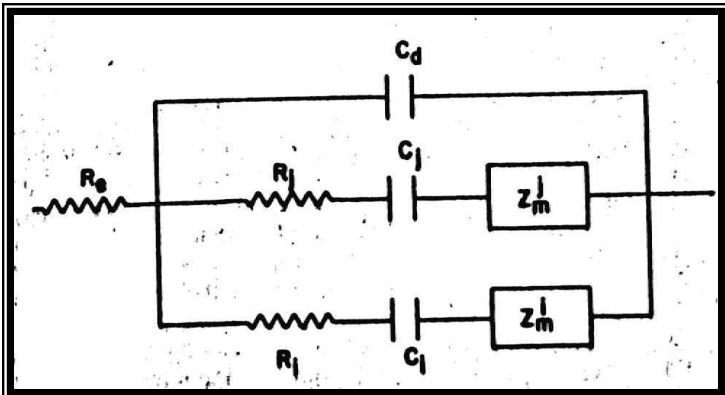
CELL MEMBRANE



1 microfarad/cm²

Animal Plasma Membrane

(Magnified approximately 4.5 million times)



TransMembrane Potential = -70 to -100 mV only in healthy individuals. HV PEMF devices can boost TMP in diseased patients.

Membrane equivalent circuit

TMP is 100 kV/cm

**PREMIER Line of
High-Voltage
EMF Devices**



**PREMIER 4000
PREMIER Junior**

PREMIER 2000

**Photonic Rejuvenation Energizing
Machine & Immunizing Electrification
Radiator developed by IRI**

Relieve Pain, Help the Heart, Body



Only \$295

Our EM Pulser 78 is designed to counter electropollution with a 7.8 Hz pulse rate, also known as the Schumann Resonance of Mother Earth that we all live in. But the 7.8 Hertz rate has now been proven to provide “*cardioprotection*” from stress. Health practitioners use it and the OsteoPad, both with the same PEMF signal, to help bones and joints (“*supports human osteoblast function*” {Ehnert, Nature 7:14544 (2017)}). EM Pulser accessories offer UV and red light therapy, small magnetic probe and PulsePad. Try one today!

Backed by Published Research



EM Pulser accessories

Enter code **PC22** checkout & save **10%** One Year Warranty Parts and Labor

All these devices make you feel energized while relieving pain and inflammation you may have

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OsteoPad

Keep bones strong. Restore cartilage. The pulsed EMF (PEMF) field of this device will relieve osteoporosis, osteopenia, injury or inflammation with its unique Spiral Toroid Magnetic Field design and simulates exercise to produce bone & cartilage growth.

OSTEOPAD (20x14 inches) \$795

MAXIMAT (5 Ft x14 inches) \$995



PREMIER Jr.

40 kV Tesla Coil Electrotherapy with Noble Gas Electrodes that heal by energizing the body cells & killing viruses and germs. All models come with High Voltage Coil & carrying case.

MODEL 500 4 gas tubes \$795

MODEL 300 2 gas tubes \$595



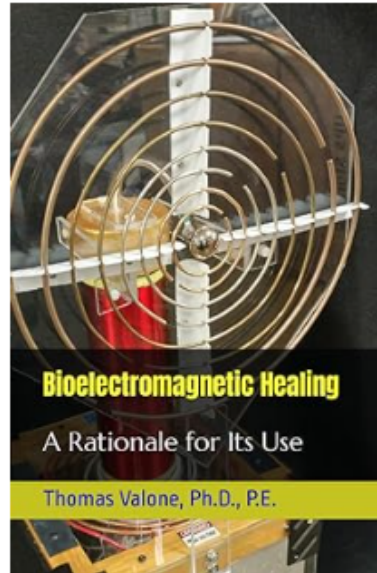


Natural Soap, Second Edition: Techniques & Recipes for Beautiful Handcrafted Soaps, Lotions & Balms (IMM Lifestyle Books)

★★★★☆ 38 -11% \$13.40 \$14.99 ✓prime

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Bioelectromagnetic Healing: A Rationale for Its Use

by Thomas F Valone PhD (Author)

4.6 ★★★★★ 11 ratings

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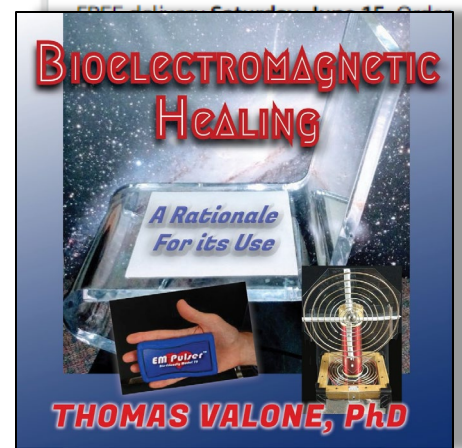
Bioelectromagnetic Healing is the only book explaining the most recent, scientific reasons for the effective use of electrotherapy. It is available in audiobook format (Audible), paperback, and hardcover. This popular book fills a gap in the popular health-related book selections by presenting clear scientific interpretations of the latest discoveries in electrotherapeutic research, backed up with easy-to-read charts and graphs. As the pharmaceutical choices for health care become more and more limited, treating only the symptoms, while at the same time, the list of side effects keeps growing more intimidating, the general bolstering of the immune system with bioelectromagnetic (BEM) healing proving to have a well-spring of positive benefits, including being completely free of side effects. This book is an outgrowth of journal articles by the author and the subject of his presentations at the "Electrotherapy and Electromagnetic Medicine" Seminar held for 150 attendees in November, 2003 at the Sheraton College Park in Maryland as well as an "Electromedicine

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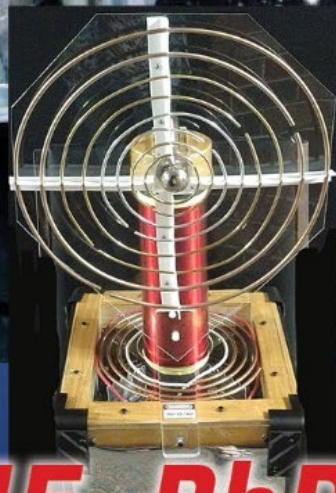
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My handbook for electrotherapy has sold thousands of copies and is available on Audible, Kindle, Paperback, and Audio CD →

BIOELECTROMAGNETIC HEALING

*A Rationale
For its Use*

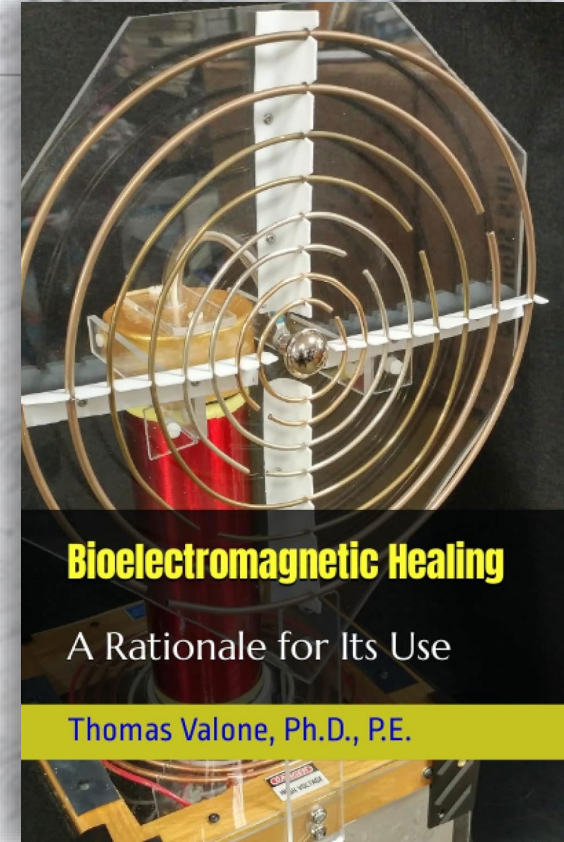


Audio
Book
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THOMAS VALONE, PhD

Recommended Reading

Integrity Research Institute books



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Electrotherapy Devices and Videos



Relieve Pain, Help the Heart, Body



Only \$295

Our EM Pulser 78 is designed to counter electropollution with a 7.8 Hz pulse rate, also known as the Schumann Resonance of Mother Earth that we all live in. But the 7.8 Hertz rate has now been proven to provide “*cardioprotection*” from stress. Health practioners use it and the OsteoPad, both with the same PEMF signal, to help bones and joints (“*sup-ports human osteoblast function*” {Ehnert, Nature 7:14544 (2017)}). EM Pulser accessories offer UV and red light therapy, small magnetic probe and PulsePad. Try one today!



EM Pulser accessories

Backed by Published Research

Enter code **PC22** checkout & save 10% One Year Warranty Parts and Labor

All these devices make you feel energized while relieving pain and inflammation you may have

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40 kV Tesla Coil Electrotherapy with Noble Gas Electrodes that heal by energizing the body cells & killing viruses and germs. All models come with High Voltage Coil & carrying case.

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MODEL 300 2 gas tubes \$595



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