

PEATDUSTER

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Delta-Sierra Group Newsletter

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FROM THE EDITOR

The most difficult part of preparing a newsletter is not what to include, but what we shouldn't include. Sierra Club National must have the same problem with their magazine, *Sierra*. How do you include articles that are relevant to all your readers? You can't, yet we want you to know we still exist!



In this issue we offer an extremely comprehensive study of cement and concrete. This came about from reading Bill Gates new book, *How To Avoid A Climate Crisis* reviewed later on. Production of cement results in one ton of carbon dioxide into the atmosphere for each ton of cement produced and it is used for making concrete. The world uses massive amounts of concrete, so it's a problem.

We also want to show you some odd uses of concrete which may be a surprise. Of course we have some other things to discuss that probably will not appear in *Sierra* like banning electric bicycles in the woods and renaming the John Muir Trail. Let's get started with the trail.

^`.,.,..><(((°) JMT

Recently there was a short-lived effort to change the name of the John Muir Trail to a Native American name Nüümü Poyo which roughly translates to "The People's Trail" and it is pronounced like Nüümü Poyo! Although the issue may have died, you might find it interesting.

Research in this matter brings about some interesting facts. California is home to more people of Native heritage than any other state in the United States. There are currently 109 federally recognized Indian tribes in California and 78 entities petitioning for recognition. This includes the Southern Sierra Miwuk Nation wishing to be officially recognized by the Department of Interior and promoting the name change for a number of valid reasons. (We will bring you those reasons in a detailed article if this matter gets more life.)

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The John Muir Trail is officially 210 miles long with the north end starting at Happy Isles in Yosemite National Park and the south terminus at the summit of Mount Whitney.

Undoubtedly some federally recognized tribes used parts of the trail and some tribes not recognized by our federal government also used parts of the trail. According to a website devoted to the John Muir Trail, the California State Legislature granted five separate sums of \$10,000 each between 1915 and 1929 for trail improvement. \$10,000 in 1915 is equivalent in purchasing power to about \$260,409 today and in 1929 much less at about \$153,809.

The final section of trail was completed in 1938. John Muir died in 1914, one year before the trail work was started so the trail was named in his honor. Thus, I think it is fair to assume that portions of the trail were modified for hikers and pack animals and some sections were created where no trail ever existed before. Discussions also included keeping both names. The trail would then be called the John Muir Trail and Nüümü Poyo.

Another concern to think about is the precedent the Sierra Club would be setting by joining an effort to rename an iconic trail. Should we continue this trend and rename all or portions of the Pacific Crest Trail, the Appalachian Trail and others?



Photo - REE

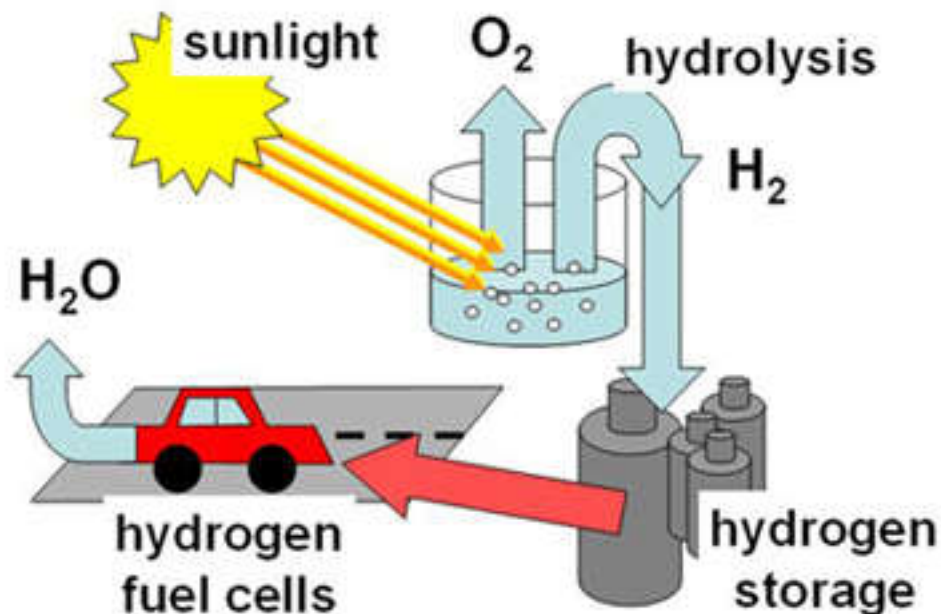
Off-Road Use of (Motorized) Vehicles

4. For purposes of this policy, electric bicycles should be treated like all other off-road motorized vehicles

My view is they haven't done their homework. How much damage is done by mountain bikes, horses and pack animals to trails compared to electric bicycles? How many electric bicycles are involved? The California Vehicle Code clearly does not call a bicycle a vehicle. I wonder if they bothered to examine all the vehicle codes of other states looking for conflicts in definitions and existing regulations. Last, when the battery runs out, is an electric bicycle still an electric bicycle? You can comment by email by contacting David Scott at davescottsc@gmail.com until May 29, 2021.

BUSES & HYDROGEN FUEL CELLS

The Delta-Sierra Group submitted a letter in support of a federal grant for the San Joaquin Regional Transit District to receive 5 new busses that are powered by hydrogen fuel cells. This is controversial because to make H₂ requires tremendous amounts of electricity that comes from use of fossil fuels these day. But SJRTD has entered a supply contract with Plug Power for 100% green hydrogen to supply the vehicles. Conquering climate change requires new technology that requires successful application and field testing. We are pleased to be part of this change.



WINDMILLS?

April 1st Public Broadcasting System hosted a conversation between our new Secretary of Energy, Jennifer Granholm, and Congressman Rodney Davis. It was refreshing to find they were debating issues of importance and respecting each other's comments. She was discussing President Joe Biden's proposal for adding more wind and solar to the electrical grid and the plan to be a zero carbon emitter by 2050.

We will forgive her because her genuine enthusiasm and positive attitude outweigh the mistake she made in the question she asked us, "Why do we buy our solar panels from China and our windmills from Denmark?" I shuddered when she said windmills. Denmark would never sell their iconic windmills to us, but maybe they will sell us Greenland. Wind Turbines - please call them wind turbines.

SPOT THE DIFFERENCE



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LET MY LITTLE LIGHT SHINE

Probably the weirdest species on the planet is the duck-billed platypus. This mammal wanted to evolve into a duck, but perhaps they learned there is an organization called Ducks Unlimited that hunts and eats duck. This creature has a duck bill, webbed feet and fur skin and is seriously declining in numbers.

Australia's iconic platypus is threatened with extinction due to climate change and human activity. Platypus reproduction is nearly unique and is one of only two mammals (the echidna is the other) that lay eggs. Females seal themselves inside one of the burrow's chambers to lay their eggs.

If this isn't strange enough, researchers at Northern College in Wisconsin found that if you viewed a typical brown platypus museum specimen under ultraviolet light, the fur glowed with an eerie greenish-blue color. We know this as **biofluorescence**.



So far as we know there are only two other mammals on the planet that have this trait, the flying squirrel and the cutie found at the Lodi Lake Nature area next to the Mokelumne River shown on the next page.



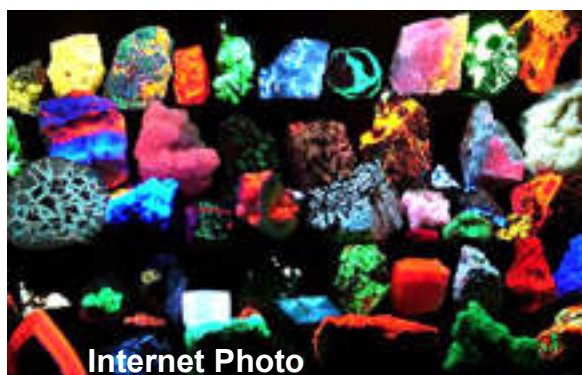
Normally we don't carry a UV light with us at night so possibly we have not encountered every species that glows in the dark. We know very little about this evolution. Speculation suggests it may be an adaptation to see and interact with each other at night.

Further explanation may be useful. Biofluorescence is the phenomenon where an organism absorbs low wavelength light (dim light) and emits high wavelength light that makes it glow against a dark background. On the contrary, bioluminescent organisms emit light from their body parts due to some specific chemical reactions.

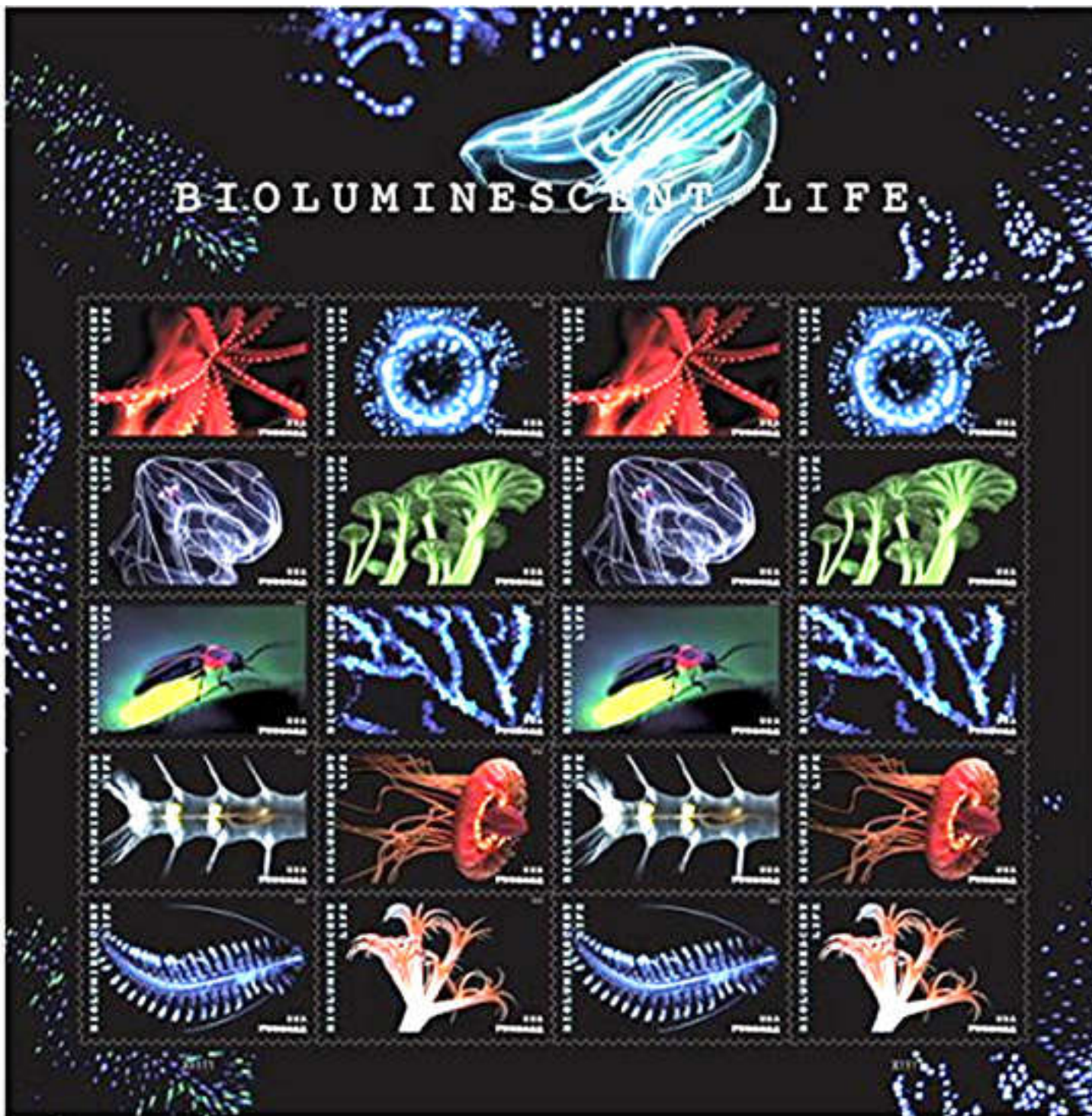


Bioluminescence is found in many marine organisms: bacteria, algae, jellyfish, worms, crustaceans, sea stars, fish, and sharks to name just a few. In fish alone, there are about 1,500 known species that luminesce. In some cases, animals take in bacteria or other bioluminescent creatures to gain the ability to light up. In case you missed it, the United States Postal Service issued a sheet of bioluminescence underwater creatures shown on the next page. If you would like to read more just follow this link:

https://about.usps.com/news/national-releases/2018/pr18_013.htm



Just to be clear there are several minerals that emit light, or glow under ultraviolet light. Non-visible to the human eye UV reacts with the chemicals in minerals and causes the rock to fluorescence. If the glow remains after you remove the light source, you have a **phosphorescent** mineral.



There is one more creature that is part of this story. Some 1500 feet below the sea's surface where the pressure is about 660 psi, Humboldt squid hunting in the darkness in groups appear to carry on complex conversations by changing color patterns of their light-emitting skin. (Continue on Page 7)

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Scientists from Stanford University and the Monterey Bay Aquarium Research Institute used unmanned robotic submarines to film 30 of these roughly 6-foot-long cephalopods off the California coast. They observed that the squid moved easily through dark waters without colliding or competing for prey. This suggested that the animals, which have small

bioluminescent organs in their muscle tissues, use changes in pigmentation patterns as an effective means of communication. The scientists also found that the squid use these skin patterns in specific sequences, similar to how humans arrange words in a sentence.

~\`.,.,.,.><(((°> **SPINACH MAIL**

We need to add Spinach to our email list so they can receive our newsletter! Scientists have managed to engineer spinach plants which are capable of sending emails. Through nanotechnology, engineers at Massachusetts Institute of Technology in the US have transformed spinach into sensors capable of detecting explosive materials. These plants are then able to wirelessly relay this information back to the scientists.

When the spinach roots detect the presence of nitroaromatics* in ground water, a compound often found in explosives like landmines, the carbon nanotubes within the plant leaves emit a signal. This signal is then read by an infrared camera, sending an email alert to the scientists. "Plants are very good analytical chemists," explained Professor Michael Strano who led the research. "They have an extensive root network in the soil, are constantly sampling groundwater, and have a way to self-power the transport of that water up into the leaves." (*In organic chemistry nitroaromatics describes any aromatic compound containing one or more nitro groups.)



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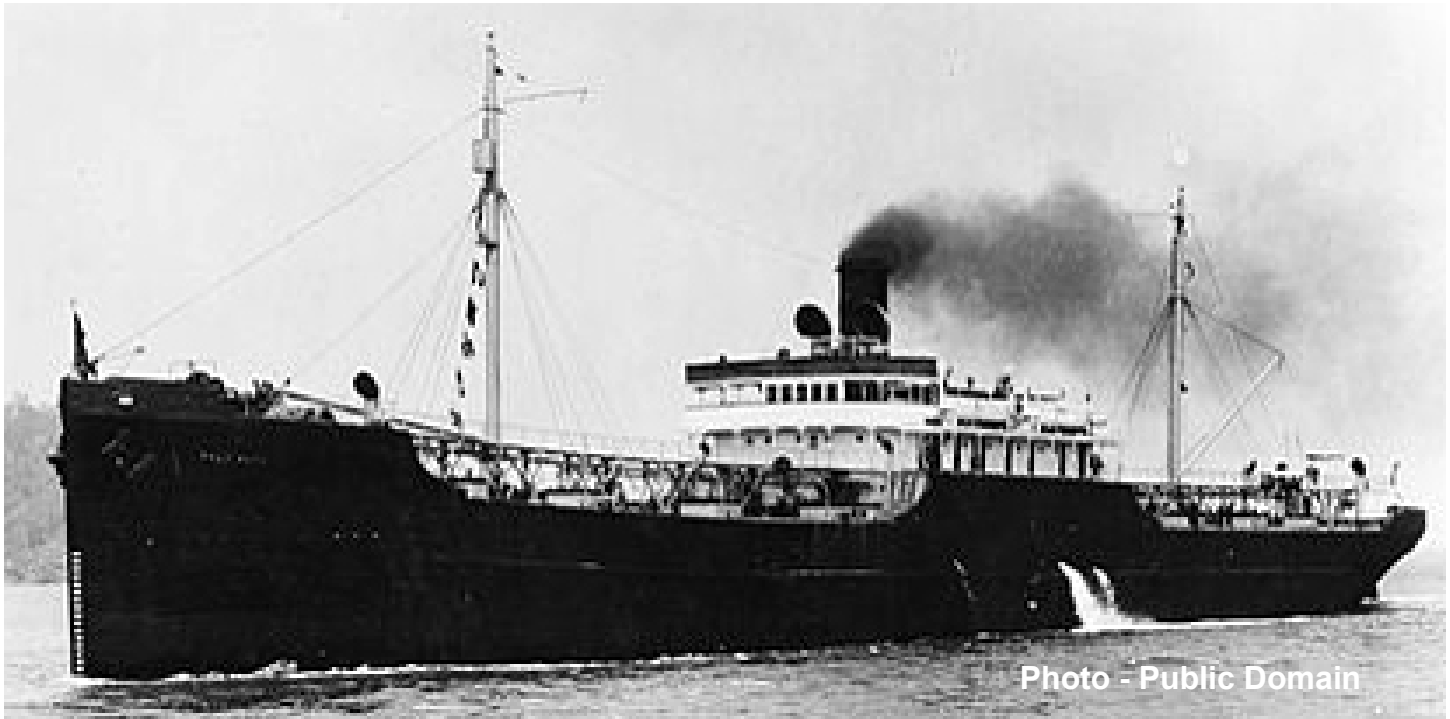


Photo - Public Domain

A pier was built leading to the ship in 1930, and she was intentionally sunk in a few feet in the water so that her keel rested on the bottom. There she was refitted as an amusement ship, with amenities including a dance floor, a swimming pool and a cafe.



Photo - Raymond Masoner

So why all the fuss over cement? Cement is one of the worst products for the environment we make on this planet. For each ton of cement that is made, we emit one ton of greenhouse gases into the atmosphere. And the world makes a lot of cement. You probably noticed we already told you this earlier!

For example a project is proposed for Stockton called the South Stockton Commerce Center Project. It will include about 6 million square feet of development that is not yet determined.

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This will result in a massive use of concrete and of course, cement. Producing a ton of cement requires 4.7 million BTU of energy, equivalent to about 400 pounds of coal, and generates nearly a ton of CO₂.

It does not matter where the cement was manufactured. Our atmosphere doesn't require passports nor does it care about border walls. We should probably include this fact in our future environmental assessments. Once the CO₂ finds its home, it will stay there for about 300 to 1000 years. Thus, as humans change the atmosphere by emitting carbon dioxide, those changes will endure on the timescale of many human lives.

In his book *How To Avoid A Climate Crisis* which we review later in this newsletter, Bill Gates introduces two numbers: 51 and 0. The world is producing 51 billion tons of greenhouse gasses a year into our atmosphere and we urgently need to get to 0. (There are conflicting estimates available, some say more and some say less, but too much is still too much.)

Cement is manufactured through the high temperature heating of materials like silica, alumina, and iron, which results in a material called "clinker", which is then ground and mixed with limestone and gypsum to produce concrete. Concrete is essentially a mix of aggregates (sand and gravel or crushed stone) and paste (water and cement). Portland cement is a generic term to describe the type of cement used in almost all concretes.

Cement production reached an estimated 90 million metric tons in the United States in 2020, in comparison to the 4.1 billion metric tons of cement produced worldwide.

China produces the most cement globally by a large margin, at an estimated 2.2 billion metric tons in 2020, followed by India at 340 million metric tons in the same year. Cement manufacturing is highly energy and emissions intensive because of the extreme heat required to produce it.

It appears that almost all world countries produce some cement shown in the following link below:

https://en.wikipedia.org/wiki/List_of_countries_by_cement_production

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Gates helps us understand that those intense weather events we saw in Texas earlier this year are still just weather events greatly enhanced by global climate change caused by greenhouse gases. He ignores foolish national leaders who sometimes said after a severe snow storm, “Gimme some of that global warming!”

By now you are probably wondering why Bill Gates should be the poster boy for fighting climate change. He responds, “I am aware that I am an imperfect messenger for climate change...I own big houses and fly in private planes – in fact I took one to Paris for the climate change conference. I can’t deny that I am a rich man with an opinion...I’m a technophile.” (His net worth was \$133 billion as of January 2021.)

Now you have a choice about reading the rest of his book where he gradually reveals facts he learned creating Microsoft, his successes and losses investing millions in new technologies and the difficulties the Bill and Melinda Gates Foundation encountered attempting to end world malaria.



Gates believes we can get to zero, but it is going to cost us big time and he uses a term he created he calls, “Green Premium.” His wealth has helped him surround himself with some of the world’s best scientists, inventors, engineers and entrepreneurs on the planet. He has formed some foundations that have sponsored new research and in some cases they have flopped.

Throughout the book Bill Gates has short stories about mishaps and successes. I often got the impression he wanted to share more with us, but he had an editor that told him to keep it simple. He casually mentions that nuclear power is one of the sources of energy we will need to get to zero carbon. In 2008, he says, he formed a company called TeraPower and they have a nuclear reactor design that is completely safe based on computer modeling. He is seeking federal grants to build a prototype. You can find TeraPower stock on the Nasdaq and it is running about \$20 a share.

Explore, Enjoy and Protect the Planet

(It is not possible to place a proper sidebar in this 2002 version of Microsoft Publisher, so it will just be part of this page.) In another part of the book Bill Gates mentions that some of our Navy ships run on nuclear power. Any discussion containing the word *nuclear* produces anxiety for some, but we need to face it and we do that now. Here's why. Remember 51 and 0.

It is difficult to get an accurate 2021 number of nuclear powered submarines out there, but this might be close: United States - 71, Russia - 33, United Kingdom - 11, France - 10, India - 2 and China has 6. We don't know why the US nuclear powered Thresher sank April, 1963. We have 11 nuclear powered aircraft carriers.

In 1978 Ranch Seco had a problem that led to automatic reactor shutdown. It was decommissioned in 2009. Only one of five Satsop Nuclear Power Plant projects went on line in Washington State. That project was plagued with cost overruns. Certainly you must read about the 1975 cable tray fire at the Browns Ferry facility located on the Tennessee River near Decatur and Athens, Alabama. The fire started when a worker using a candle to search for air leaks accidentally set a temporary cable seal on fire. That moron was probably promoted to CEO of the company.

Barsebäck, located 20 kilometers from the Danish capital, Copenhagen, was closed by Sweden at the urging of the Danish government. Some of you may even know that in the 60's the Sierra Club prevented the construction of a nuclear power plant at Bodega Bay California. Pacific Gas and Electric had already started work when it was discovered it was being built on a pesky earthquake fault! You can find all kinds of stories and statistics like this with a little searching. These events are of interest to me because I was living in Olympia 30 miles from Elma Washington when that plant was abandoned and Copenhagen when the Swedish plant was closed.

Yet, three nuclear accidents have influenced the discontinuation of nuclear power the most: the 1979 Three Mile Island partial nuclear meltdown in the United States, the 1986 Chernobyl disaster in the USSR (now Ukraine), and the 2011 Fukushima nuclear disaster in Japan. Those events will affect TeraPower's success.

Nevertheless whether nuclear energy will be part of our solutions for eliminating CO2 from our atmosphere, Bill Gates includes it in his shopping list of technologies needing actions to solve climate change.

Grid-scale electricity storage that can last a full season
Underground electricity transmission
Electrofuels
Advanced biofuels
Geothermal energy
Pumped hydro
Thermal storage
Hydrogen produced without emitting carbon
Next-generation nuclear fission
Nuclear fusion
Zero-carbon cement
Zero-carbon steel
Zero-carbon plastics
Zero-carbon fertilizer
Zero-carbon alternatives to palm oil
Plant and cell-based meat and dairy
Drought- and flood-tolerant food crops
Carbon capture (both direct air capture and point capture)
Coolants that don't contain F-gases

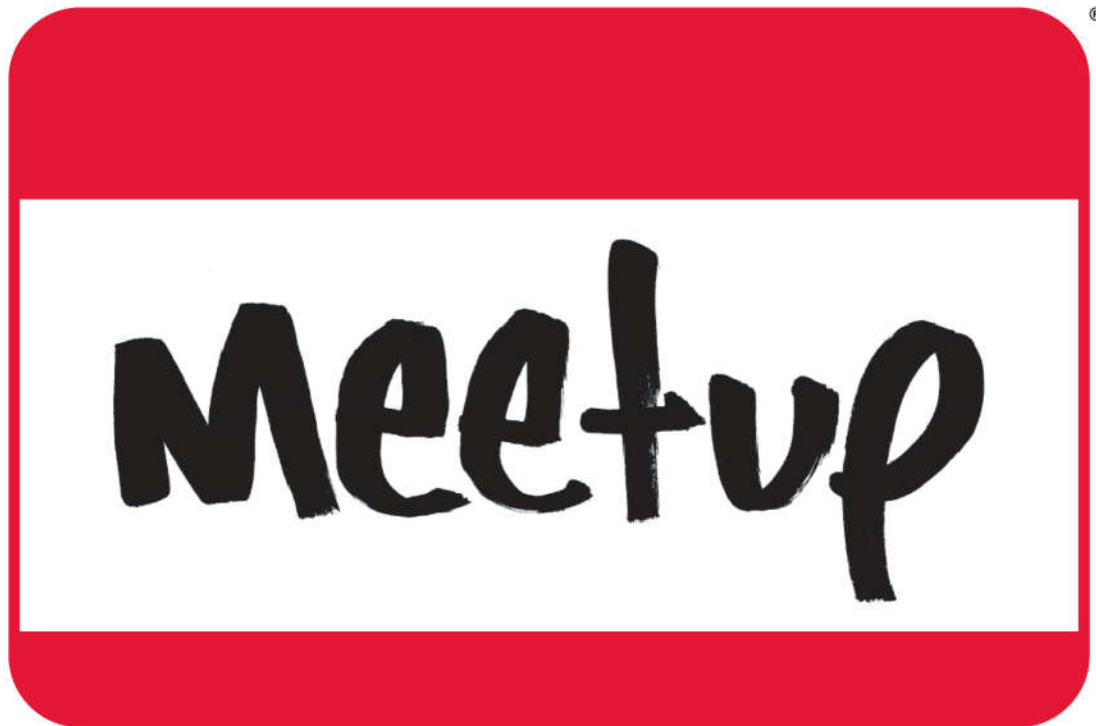
In a video interview Bill Gates said, “When people think about climate, they think about making electricity and about passenger cars mostly. They aren’t aware that there are many other sources of CO2 emissions including when we make cement or steel or when we grow cows - in some countries to eat beef. Electricity, transport, food, buildings and manufacturing are the biggest areas of emissions. The challenge to get to zero is you can’t skip any of these areas of emissions. You have to do even the hard ones.”

You can purchase this book from Amazon.com for \$20 plus CA tax. Robert Evans who wrote this review believes you will have fun reading it.

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Stockton, Modesto & Sonora Sierra Club Groups
Find us at this active link:

<https://www.meetup.com/S-M-S-SierraClub/members/28813452/>



We have been in operation since October 2011 and now have 2059 members. During COVID 19 we are following California State restrictions by holding occasional Zoom meetings in your home.



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Please use the following email address to contact any members of your Executive Committee or staff. In the subject line please include the name of the person or persons you wish to contact.

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THE LAST PAGE



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“People tend to focus on the here and now. The problem is that, once global warming is something that most people can feel in the course of their daily lives, it will be too late to prevent much larger, potentially catastrophic changes.”

Elizabeth Kolbert

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