We all want our grandchildren’s grandchildren to live a good life, but it may not be front and center with you today.

But, what if your biggest customer who buys your most profitable product leaves you because a competitor offers a similar product that is made SUSTAINABLY?

Your bank!!!

MY GOAL: HOW DO I MAKE SUSTAINABILITY PROFITABLE FOR YOUR BUSINESS???

THE STONE AGE DIDN’T END BECAUSE WE RAN OUT OF STONES

IF MONEY ISN’T THE ANSWER, ASK THE QUESTION AGAIN
Investment firm Neuberger Berman began a comprehensive review of its $304 billion portfolio last year, specifically to understand how their investments will be affected by climate change. The verdict is in, and it isn’t good. The portfolio review offered some useful insights. European companies are better prepared for climate change impacts than their U.S. competitors. Companies that operate inland may underestimate the risks presented by increased heat and wildfires. With their current mix of power generation, many U.S. utilities won’t be viable within 15 years. “There are companies we view as having no real value under a 2-degree increase scenario,” referring to what scientists agree is the maximum amount of tolerable warming. “If I look at the oil and gas sector, they are not on track for a 2-degree world and they don’t believe one will happen.” Public companies are increasingly facing pressure from investors to consider and disclose their Climate readiness.

“Climate-related financial risks could affect the economy through elevated credit spreads, greater precautionary saving, and, in the extreme, a financial crisis.”

—Glenn Rudebusch, the San Francisco Fed’s executive vice president for research, warning that climate change could trigger an economic crisis.

IS YOUR BUSINESS VULNERABLE?

× My CO2 Wiki experience
× Do you have a seat at the table or are you what’s for dinner?
IS SUSTAINABLE ENERGY A REALISTIC GOAL?

A Persian rug and my granddaughter’s future set me on a new path.

CO2 LEVELS RISING FASTER THAN TECHNOLOGY

RAINBOW STEW
MERLE HAGGARD

- When they find out how to burn water
  And the gasoline car is gone
  When an airplane flies without any fuel
  And the satellite heats our home
- One of these days when the air clears up
  And the sun comes shinin’ through
  We’ll all be drinkin’ that free bubble-up
  And eatin’ that rainbow stew
THE AUTOMOBILE ACCIDENT

AUDIENCE PARTICIPATIONS

- Pick a number between 2 and 9
- Multiply that number by 9
- Add together the two digits in your answer
- Subtract 5 from that number
- Pick the letter of the alphabet that corresponds to that number
- Choose a country name that starts with that letter
- Think of the 2nd letter in that country's name
- Choose an animal that begins with that letter
- Think of the color of that animal

AIN'T NO MOUNTAIN HIGH ENOUGH
THE TEMPTATIONS

- 'Cause baby there ain't no mountain high enough,
- Ain't no valley low enough,
- Ain't no river wide enough
- To keep me from getting to you
I WISH CARL SAGAN HAD LIVED LONGER

The basics of the phenomenon that CO2 was a greenhouse gas that warms Earth were worked out well over a century ago by the French scientist, Svante Arrhenius in 1896. His paper, published in the Philosophical Magazine and Journal of Science, was the first to quantify the contribution of carbon dioxide to what scientists now call the "greenhouse effect."
The IEA said it expects the world's appetite for oil to grow at an average annual rate of 1.2 million barrels a day up to 2024, reaching 106.4 million barrels a day, compared with 99.2 million barrels a day in 2018.
STILL MAKING TOO MUCH CO2, BUT…

Good news: We have already been de-carbonizing energy the last 150 years because technology made it cheaper
Charcoal
Coal
Fuel Oils
Natural gas, Hydro-electric, Nuclear, Solar, Wind
Soon to be hydrogen

ZERO CARBON

* New Mexico, California, Hawaii are among the states that have passed laws requiring that all of their power from clean sources in the coming decades.
* Puerto Rico: 100% renewable energy goal by 2050.
* A group of 19 countries officially launched the Carbon Neutrality Coalition
* European Commission is expected to publish a document outlining policy scenarios to reach carbon neutrality by 2050.

IT’S DELAYED BUT IRREVOCABLE WITHOUT CHANGE

* As of early 2017, the Earth had warmed by roughly 2 degrees Fahrenheit since 1880.
* The number may sound low, but the heat accumulating in the Earth because of human developed emissions is roughly equal to the heat that would be released by 400,000 Hiroshima atomic bombs exploding across the planet every day.
* Scientists believe most of the warming since 1950 was caused by the human release of greenhouse gases. If emissions continue unchecked, they say the global warming could ultimately exceed 8 degrees Fahrenheit, which would transform the planet and undermine its capacity to support a large human population.

IEA: US to drive global oil supply growth; no peak oil demand in sight
Since recession of last Ice Age, we are supposed to be in a cooling period. Yet we are warming as CO2 levels rise faster than any time in history.

During the Industrial Revolution we have released 100 million years of previously sequestered CO2 in 200 years. Most of in the last 50 years.

### BATTERIES-GEOTHERMAL-NUCLEAR-SOLAR

- The key breakthroughs will be cheaper and more powerful batteries.
- Affordable systems to capture and store carbon emissions from fossil fuel plants.
- Small-scale, affordable nuclear reactors.

### OUR OCEANS ABSORB THE HEAT

- Since 1955, over 90% of the excess heat trapped by greenhouse gases has been stored in the oceans.
- The remainder of this energy goes into melting sea ice, ice caps, and glaciers, and warming the continents' land mass.
- Only the smallest fraction of this thermal energy goes into warming the atmosphere.
OUR JET STREAM

THE 6TH EXTINCTION

ELIZABETH KOLBERT

Scientists Say Ocean Circulation Is Slowing. Here’s Why You Should Care.

Plummeting insect numbers ‘threaten collapse of nature’
### WHAT CAUSED CLIMATE CHANGE?

- Continental drift changing ocean currents
- Volcanic activity
- Asteroids
- Earth’s orbital variations and rotational changes
- Oxidational period 2.3 million years ago
- No single cause and lots of questions among experts
- Glaciologists believe this would have been a cooling period if not for human intervention

### FEMA FLOOD INSURANCE

- Climate advocates say an overhaul of the nation's flood insurance program being unveiled by the Trump administration will spur communities around the country to better plan for extreme weather, and will drive up costs for some homeowners.
- The changes announced by the Federal Emergency Management Agency will tie premiums to the actual flood risk facing individual homes nationwide starting in October 2020.

### YOUR PERSONAL BUDGET

- When your beach property’s annual insurance premium is 20% of what you paid for the property
- When you can’t sell your beach property
- When your primary residence insurance rates skyrocket because of insurance company losses
- Health insurance rates rise due to respiratory illnesses
WE DON'T HAVE AN ENERGY CRISIS BUT AN ENERGY STORAGE CRISIS.

- One hour of sunlight provides more than all of the energy consumed on the planet in a year. Mega-scale energy storage is a critical problem in the future of renewable energy and that would be supported by the existing regulated utilities as they fit the model for centralized power.
- The envisioned water-based organic flow batteries would last for about 5,000 recharge cycles
- At one-tenth the cost of lithium-ion batteries, they're also sustainable

TODAY'S BATTERIES AREN'T ENOUGH

A viable alternative to lithium ion batteries may be found in sulfur, an abundant and cheap natural resource. Researchers have produced triple the energy for its size than current lithium-ion technologies.

The USC School of Engineering has turned to a different natural resource to improve cellphone batteries using sodium as a replacement for lithium.

THE DEPARTMENT OF DEFENSE IS FUNDING BATTERY RESEARCH FOR "IN THE FIELD" OPERATIONS.

- Battery Reality: There's Nothing Better Than Lithium-Ion Coming Soon
  Falling prices and sink costs mean that the reigning storage technology has a lasting look.
Engineers in Belgium say that solar panels could produce hydrogen gas on site, allowing families to heat their homes without expanding their carbon footprints. Converts sunlight directly into hydrogen using moisture in the air with 15% efficiency, which was 0.1% efficiency 10 years ago.

**CHINA’S MANDATES**

Producing cement, the main ingredient in concrete, creates 5% of global carbon emissions.

The Rice engineers used a statistical analysis method to calculate the best cement mix. They found that the best mix is about 80% fly ash and 5% of sodium-based activator. The rest is made up of silica nanoparticles and calcium oxide.
If you think things are bad now, it's estimated that by 2050, there will be more weight of plastic in the oceans than fish.

European Plastics Mandates
• Plastic Plates, Cutlery, Cups to Be Banned in Europe as of 2021
  - European Parliament votes to prohibit single-use plastic items

Water Scarcity Around the World: Day Zero
• Cape Town, California, Southwestern US
  - Whiskey is for drinking; water is for fighting over.
  - Mark Twain
WHAT AM I DOING?

- Improve home and office insulation
- Install a smart thermostat
- More efficient light bulbs, turn off the lights in any room where you are not using them
- Drive fewer miles and plan trips so I can take the train more
- Take fewer airplane trips
- Hybrid car
- Do Renewable gas projects: Landfill, Dairy and Hog

WHAT ELSE CAN I DO?

- Use my bully pulpit to educate others in business and politics and help promote new technologies
- Meet and work with environmentalists to find middle ground to a common goal
- Educate energy regulators
- Help green energy producers meet with businesses

WHO WILL IMPEDE PROGRESS?

- Follow the money. Whose “Ox gets gored”?
- Big, centralized power generators stand in the way of distributed power
- Will a “great innovator” like Elon Musk push against hydrogen cars in favor of his battery models?
- Always the opposition of Big Oil. Saudi Aramco made $111 Billion last year. Apple made $60 B
YOU'VE BEEN CUT OFF !!!!

Patagonia Is Refusing To Sell Its Iconic Power Vests To Some Financial Firms

BOB DYLAN

Come senators, congressmen
Please heed the call
Don't stand in the doorway
Don't block up the hall
For he that gets hurt
Will be he who has stalled
There's a battle outside a-raglin'
It'll soon shake your windows
And rattle your walls
For the times they are a-changin'.