

NATURAL CAPITALISM SOLUTIONS



A FINER FUTURE IS POSSIBLE



Natural Capitalism is an internationally recognized leader in sustainability education, strategy, and implementation.

We help companies, communities and countries implement more regenerative practices profitably



The SDGs



THE GLOBAL GOALS
For Sustainable Development

1 NO
POVERTY



2 NO
HUNGER



3 GOOD
HEALTH



4 QUALITY
EDUCATION



5 GENDER
EQUALITY



6 CLEAN WATER
AND SANITATION



7 AFFORDABLE
ENERGY



8 GOOD JOBS AND
ECONOMIC GROWTH



9 INNOVATION AND
INFRASTRUCTURE



10 REDUCED
INEQUALITIES



11 SUSTAINABLE CITIES
AND COMMUNITIES



12 RESPONSIBLE
CONSUMPTION



13 CLIMATE
ACTION



14 LIFE BELOW
WATER



15 LIFE ON LAND



16 PEACE AND
JUSTICE



17 PARTNERSHIPS
FOR THE GOALS



THE GLOBAL GOALS
For Sustainable Development

Systems view of SDGs by Johan Rockstrom and Pavan Sukhdev





2° C is much more dangerous than governments thought when the Paris deal was signed

1.5° C instead of 2° C is a huge difference

Limiting warming to 1.5° C or below is challenging but achievable

We must be net zero by 2050 but current trajectories put us far beyond that.

Report says we must cut carbon ½ by 2030.



STATE OF EMERGENCY

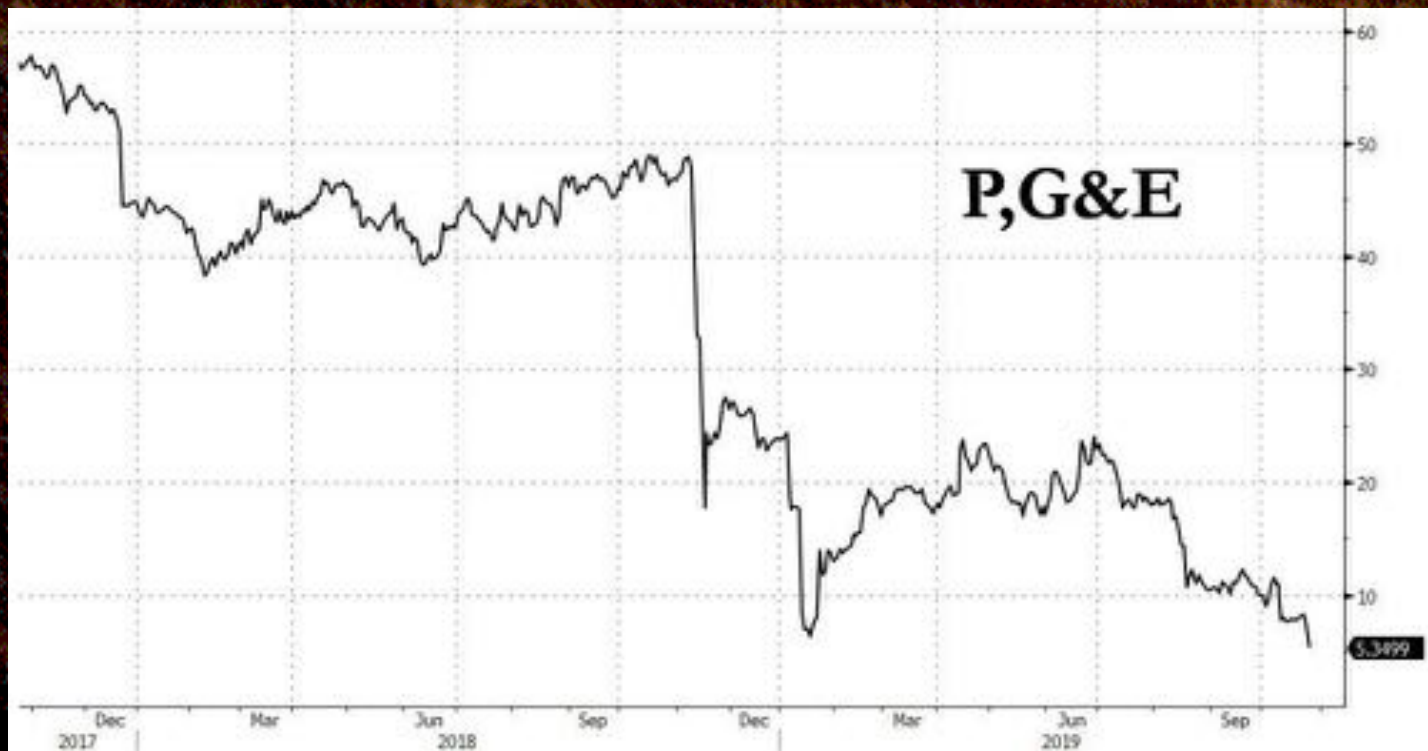
BUSINESS

PG&E: The First Climate-Change Bankruptcy, Probably Not the Last

The fast fall of PG&E after California's wildfires is a jolt for companies considering the uncertain risks of a warming planet

By *Russell Gold*

Jan. 18, 2019 9:00 am ET





Cyclone Idai left thousands dead,
hundreds of thousands homeless

Impact of climate change



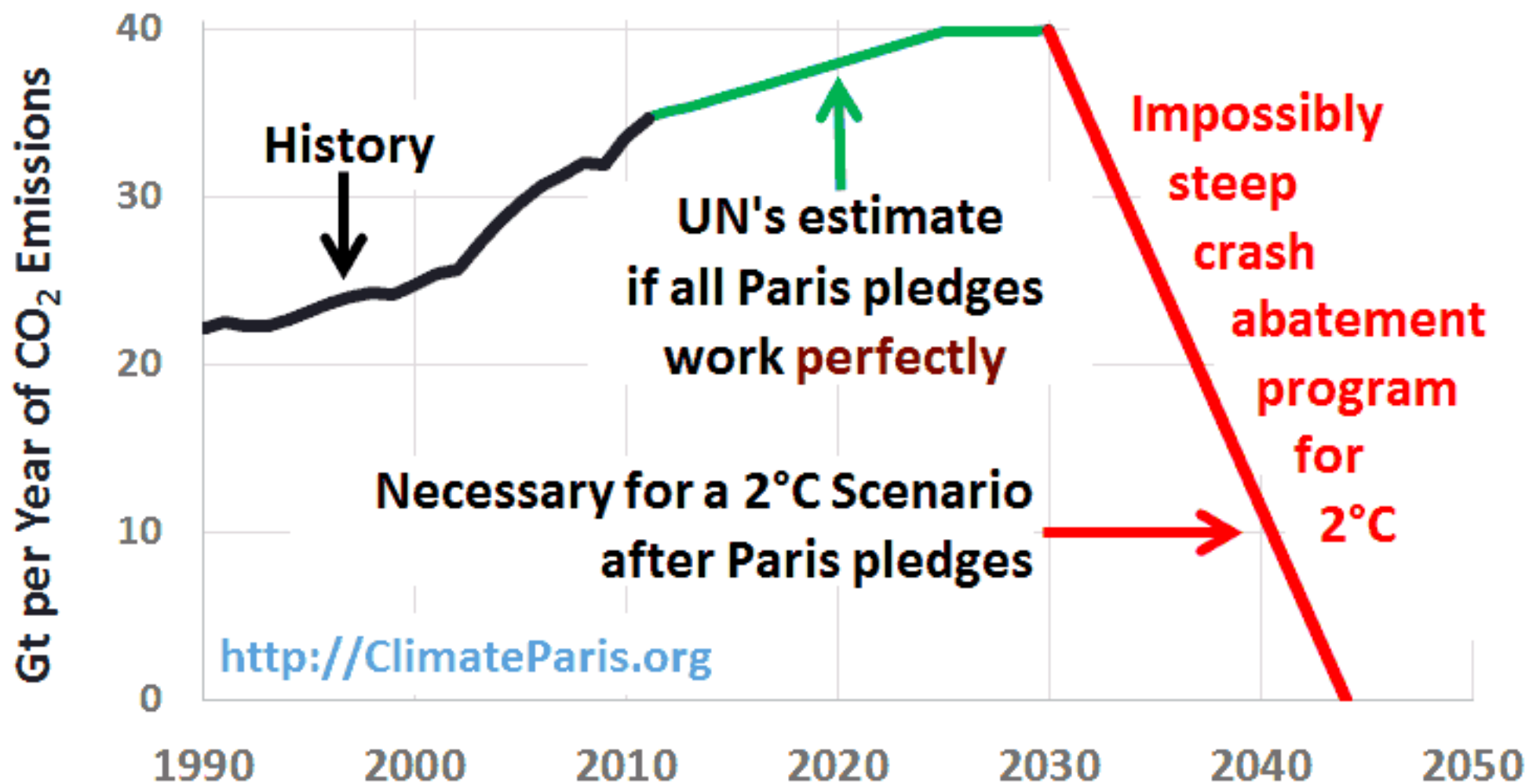
Africa is the worst victim of climate change

Arid and semiarid land to increase by between 5% to 8% (60 to 90-million hectares million hectares) by 2080s

25% to 40% of sub-Saharan species are at risk for extinction.

Cost for adaptation will exceed 5% to 10% of gross domestic product.

By 2020 between 75 – 250 million people will suffer water shortages due to climate change.



Current Situation

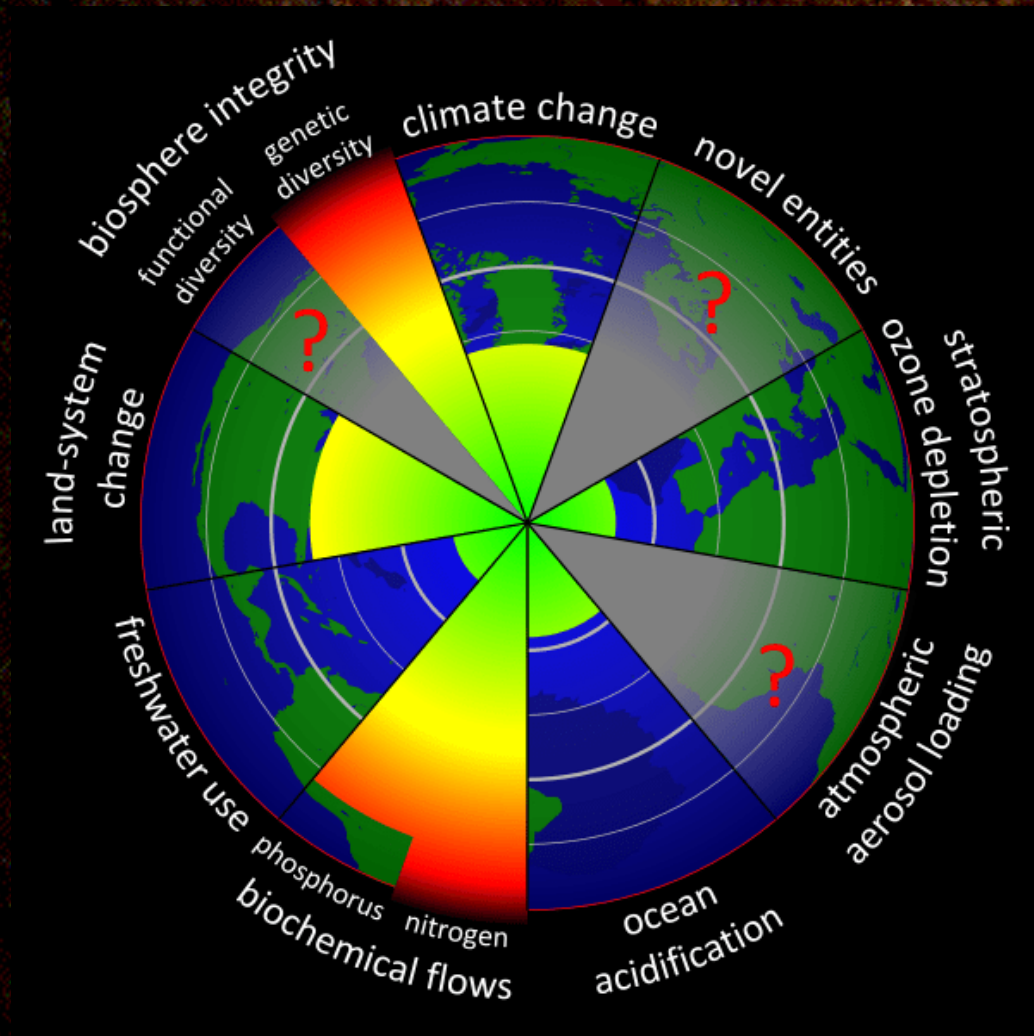
We have exceeded four of the nine planetary boundaries:

Rapid loss of biodiversity

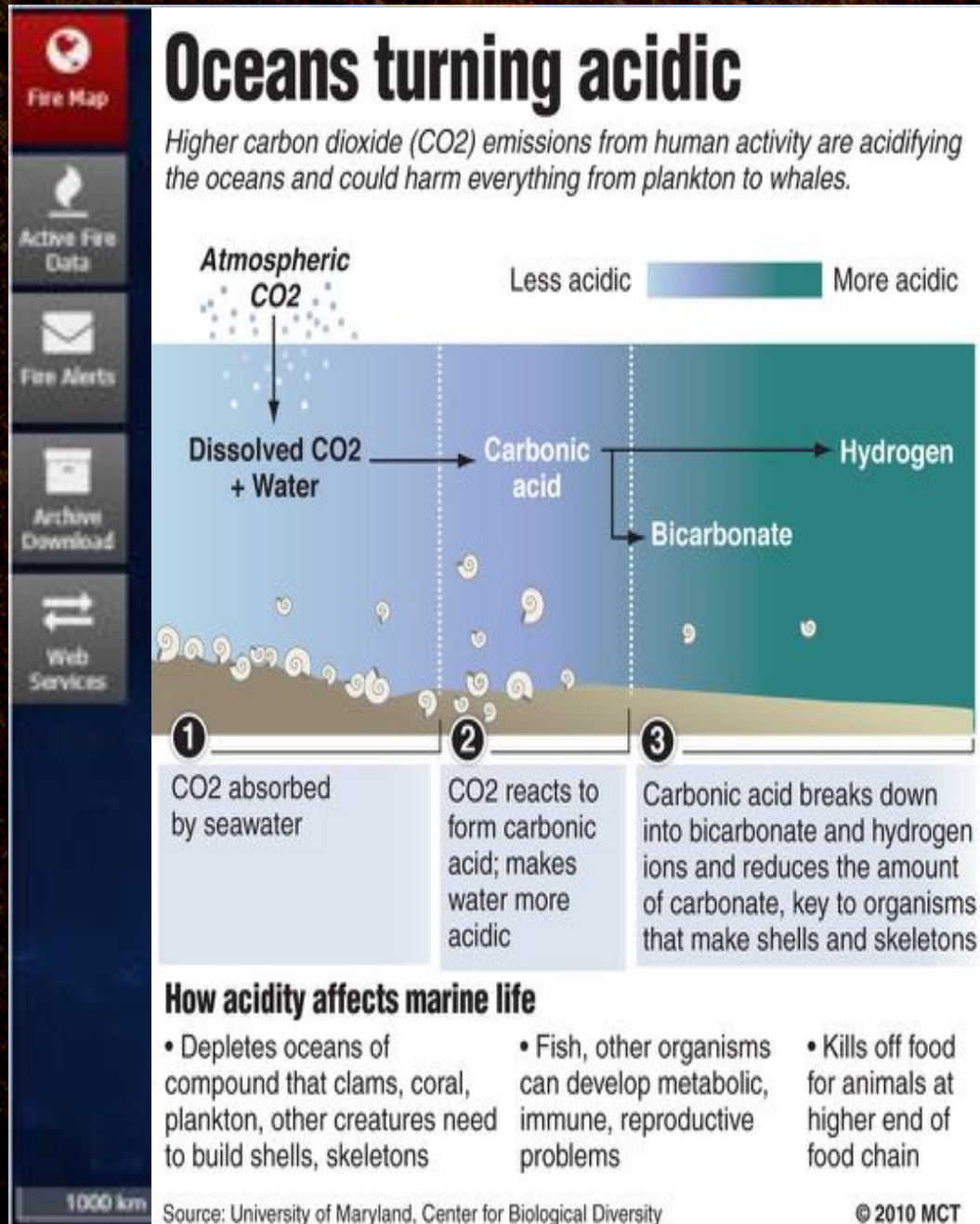
100 years of industrial ag has eroded 50 - 70% of organic matter in the soil. We've exceeded the nitrogen limit.

Ground water tables are falling meters a year, much more rapidly than they can be regenerated.

Climate crisis is existential



Global Biodiversity Outlook Three -





The Global Assessment
Report on Biodiversity and
Ecosystem Services

A million species at risk of extinction

We are failing to meet basic human minimums to ensure dignity



Inequality

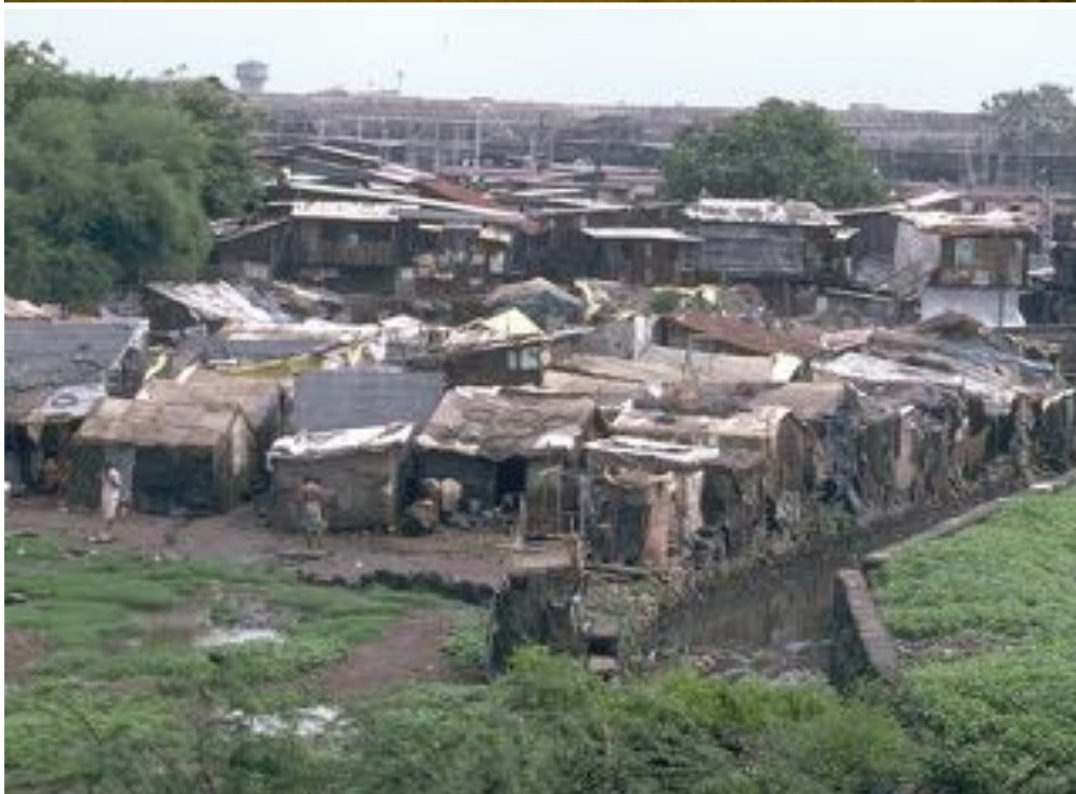
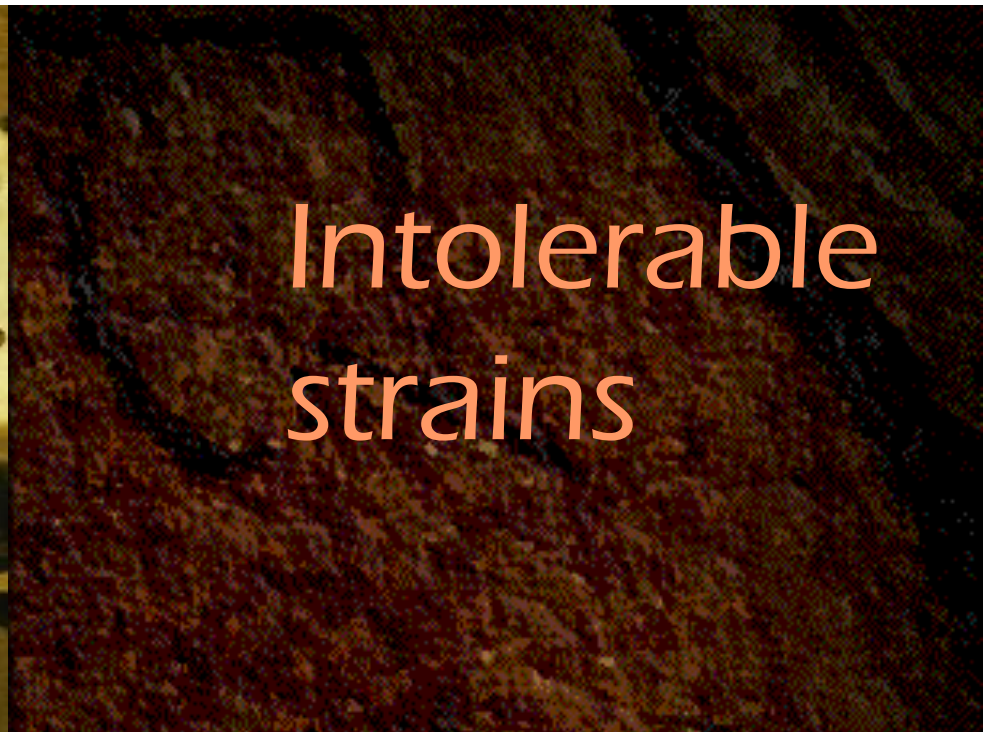


Almost half of the world's wealth now owned by just one percent of the population

Over consumption in the North

Product	Expenditure	Economic goal	Investment needed to achieve goal
Makeup	\$ 18 billion	Reproductive health care	\$ 12 billion
Pet food- EU and US	\$ 17 billion	Elimination of hunger and malnutritionn	\$ 13 billion
Perfumes EU & US	\$12 billion	Universal literacy	\$ 6 billion
Bottled water	\$ 35 billion	Clean drinking water for all	\$ 9 billion
Ice cream in EU	\$ 11 billion	Immunizing every child	\$ 1.3 billion

- 2010 military spending \$1 trillion



Poverty is not an accident.
Like slavery and apartheid,
it is man-made and
can be removed by
the actions of
human beings.

- Nelson Mandela



NASA funded the HANDY Study: Is Industrial Civilization Headed for Irreversible Collapse

The study sought to understand long-term behavior not make a short term prediction, but its warning is stark.

“Cases of **severe civilisational disruption** due to
"precipitous collapse - often lasting centuries -
have been quite common.”

Two crucial features drove collapse:

“...the **stretching of resources** due to the strain placed on the ecological carrying capacity”; and

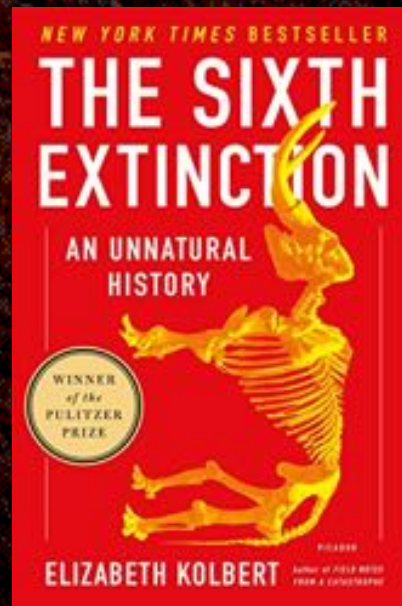
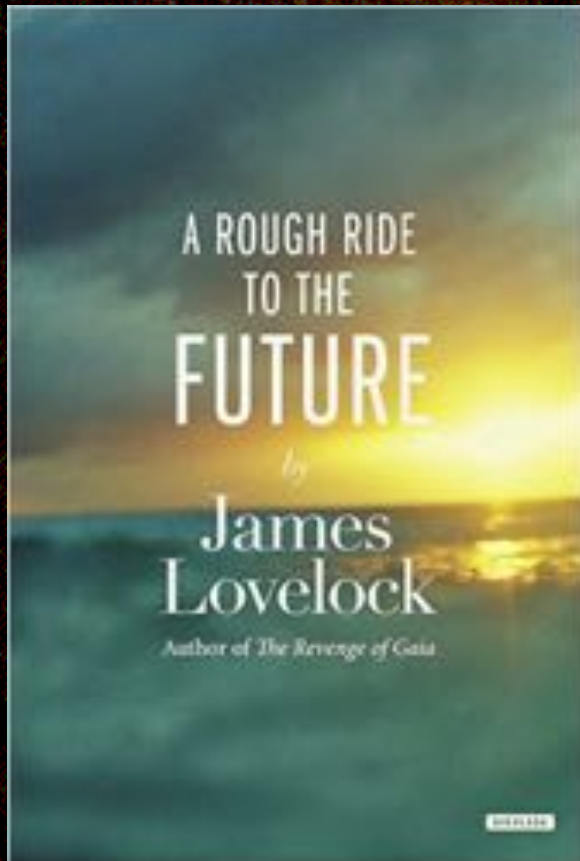
“...the **economic stratification** of society into Elites [rich] and Masses (or "Commoners") [poor]"

These phenomena have played “a central role in the process of the collapse” in all cases over “the last five thousand years.”

Some say it is
too late



Near Term Human Extinction

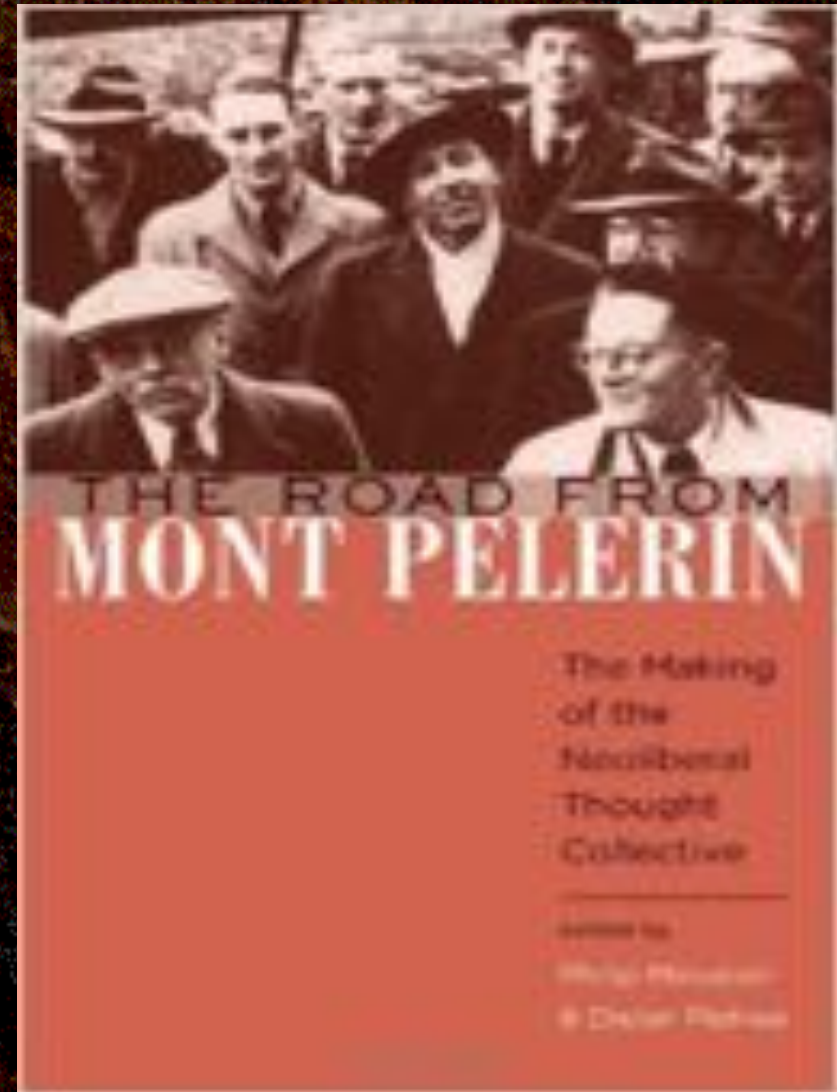


**YOU ARE THE RESULT OF 4 BILLION
YEARS OF EVOLUTIONARY SUCCESS.**

ACT LIKE IT.

Neo-liberal economics

In 1947, 36 men met for 10 days at the Mont Pelerin Hotel, Montreux Switzerland, to lay the intellectual foundation of neo-liberalism.





"Columbus did not seek a new route to the Indies in response to a majority directive."

Milton Friedman

Crafted the ideology that:

- personal freedom is paramount,
- government interference is evil,
- markets are perfect and
- there should be no constraint on an individual's freedom to make economic decisions.

1980 elections:

Ronald Reagan in US,
Margaret Thatcher in the UK:
neo-liberalism became the
dominant global economic
ideology.



“Deregulation: implemented in many countries.
Corporate directors assumed greater control, initiated hostile
take-overs of many smaller companies.

1990s / 2000s: accounting scandals, off-shoring, outsourcing,
globalization of labor, transport, and transaction costs.

2008 financial collapse was a predictable result of the systematic
dismantling of welfare state sought by neo-liberalism

Growth Of Family Income

+261%

**1947-1979:
We All Grew**

**1980-2007:
We Grew Apart**



1947-1979 Source: United for a Fair Economy (www.FairEconomy.org); Based on analysis of US Census Bureau data


1980-2007 Source: Congressional Budget Office, Average Income Pretax (www.cbo.gov); 2007 Dollars

©2011 Design by Witte Design, LLC • Tucson, Arizona • www.ConnectTheDotsUSA.com

What will it take to avoid collapse?

The minimum requirement for an economic system that can sustain humanity is one that:

1. Lives within ecological limits
2. Meets the basic needs of all humans; and
3. Has sufficient equality to maintain social stability and enable basic needs to be met.

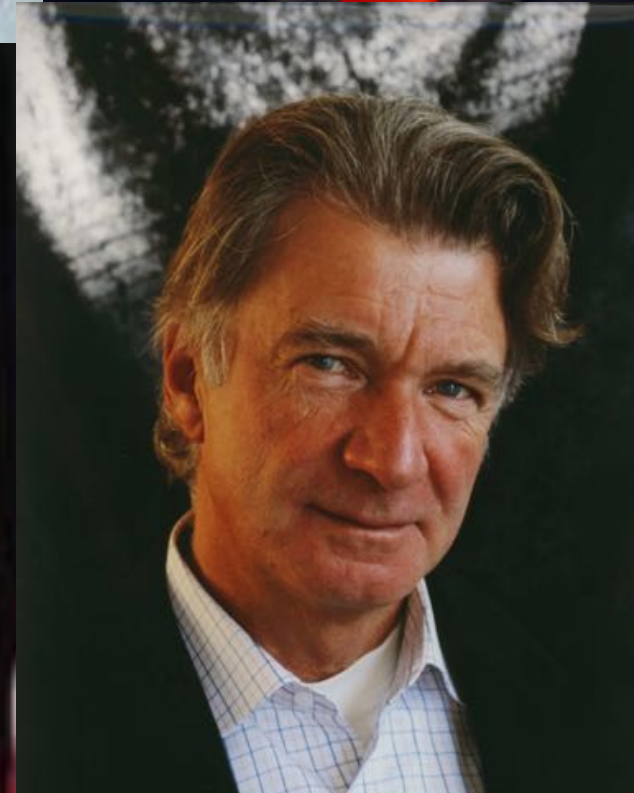
A photograph of a sunset over the ocean. The sun is a bright, glowing orb on the horizon, casting a long, shimmering reflection across the water. The sky transitions from a deep blue at the top to a warm orange near the horizon. The ocean has gentle waves, and the foreground shows a dark, silty beach. A semi-transparent grey circle is positioned on the left side of the image, containing a quote in white text.

"The key to the future
of the world is finding
the optimistic stories
and letting them be
known."

- Pete Seeger, 1919-2014.


Innovate A New Story

1. We have no choice: BAU = collapse
1. The solutions are emerging
2. It's better business: you'll make more money
3. People want it – more desirable



FOREWORD BY KATE RAWORTH, AUTHOR, *DOUGHNUT ECONOMICS*

A FINER FUTURE



CREATING AN ECONOMY
IN SERVICE TO LIFE

L. HUNTER LOVINS • STEWART WALLIS
ANDERS WIJKMAN • JOHN FULLERTON

A REPORT TO THE CLUB OF ROME

A FINER FUTURE

LOVINS • WALLIS
WIJKMAN • FULLERTON

NSP

Who Are We?

Dr. Paul Lawrence – Dr. Michael Pirson

Four Drivers

Drive to acquire

Drive to defend

Drive to bond

Drive to comprehend



Desired Outcome

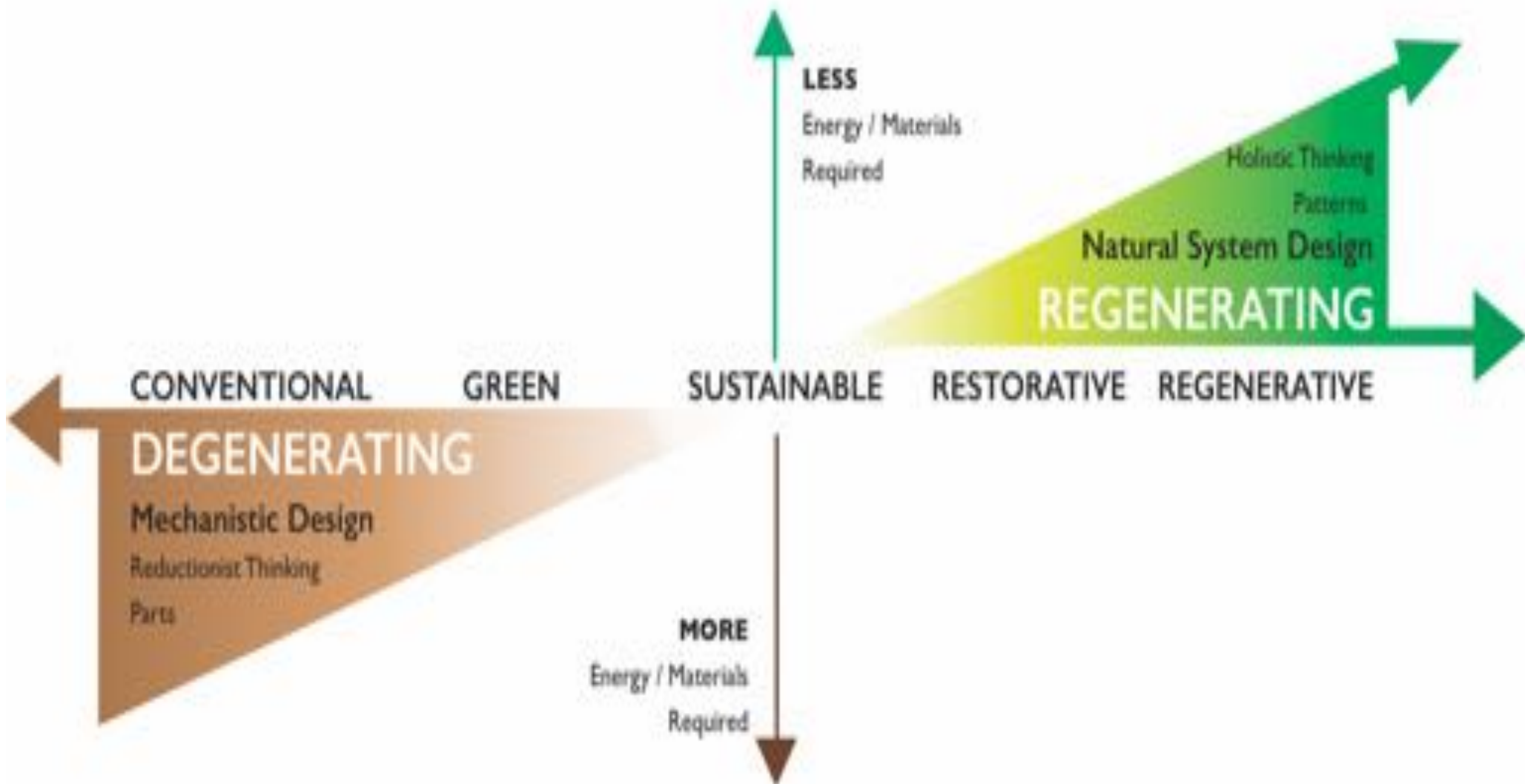
Finance

Economy



AN ECONOMY

Place - Culture - Enterprise - Government - Commons



Derived from Bill Reed, Regenesi Group

8 elements of regenerative capitalism

- in right relationship
- holistic wealth
- Innovative and adaptable
- empowered participation
- edge effect abundance
- robust circulation
- seeks balance
- honors community and place

REGENERATIVE CAPITALISM

How Universal Principles And Patterns
Will Shape Our New Economy



JOHN FULLERTON
April 2015

THERE IS NO SILVER
BULLET

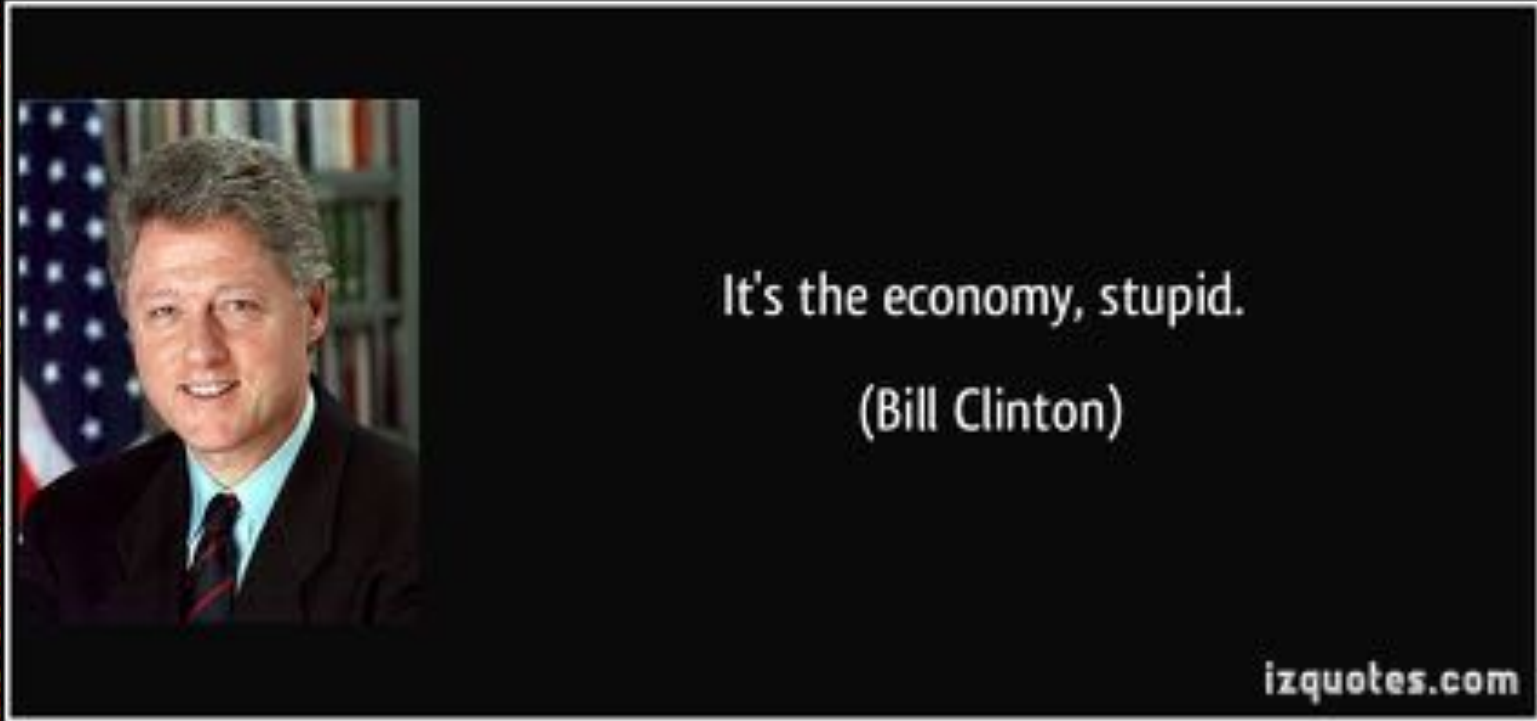
BUT WE SURE HAVE
SILVER BUCKSHOT



The future is already here;
it's just not widely distributed.

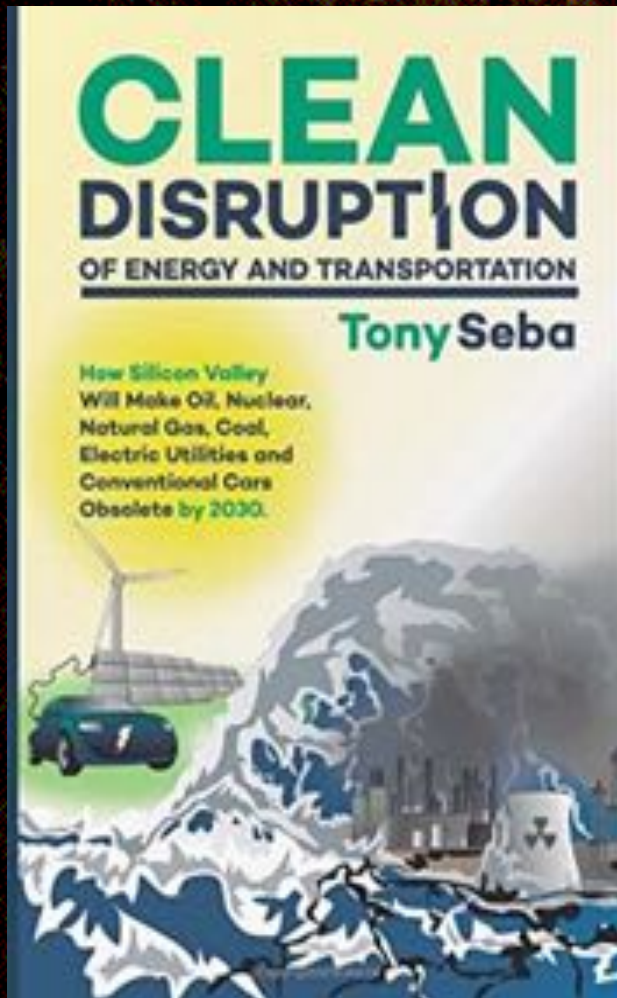
William Gibson

We have all the technologies we need
to solve **all** the challenges facing humanity



There are really only two solutions that are already here, already being commercially deployed that can solve the climate crisis at a profit, and underpin development:

Decarbonize the economy and implement regenerative agriculture



World will be **100% solar by 2030**, says Tony Seba, Stanford Professor and Silicon Valley entrepreneur,

www.tonyseba.com

2015 – Clean Disruption of Energy & Transportation

- The technologies, skills, organizations, and culture of the industrial revolution have run out of steam
- They are being replaced by the technologies, skills, organizations, and culture of the "Silicon Valley" technology revolution

1. Solar

2. Energy Storage

3. Electric Vehicles

4. Self-Driving Vehicles

- Generation, Storage, and intelligence are pushed to the edges
 - Distributed, Mobile, grid-independent
- **Bits + photons** are replacing **atoms** (coal, nukes, gas, oil)
 - Electric + ICT replacing combustion



China has already installed 112 GW: more solar than they pledged to do in 2020. 45GW for 2017. Total German capacity is 41 GW
10 nuclear plants worth of solar in 3 months 2018





China phasing out ICE cars.

Is launching world's biggest
carbon market



Investments in Battery Megafactories increasing

- ▶ **20 Li-iOn Megafactories** in the pipeline to come online by 2021 totaling **325 GWh** (1)
- ▶ **In 2014 there were just 3** (in the 2021 pipeline) **totaling 50 GWh**. (2)
- ▶ **Samsung SDI, Dyson**, LG Chem, Total, Bosch, Boston Power, BYD, TDK, Apple, Nissan, Daimler, VW, etc.
- ▶ **Tesla** may **Triple** expected output to 105 GWh (cells) / 150 GWh (packs) (4)

Tech Cost Curve has accelerated to ~20% (2010-2016)



Battery Disruption – Commercial Scale

Bloomberg

Aug 24, 2017

~~5 Million U.S. Businesses Can Cut Power Bills with Batteries~~

*National Renewable Energy Lab (NREL) study of 10,000 utility rate plans: more than a **quarter of U.S. businesses** could cut power bills if they installed batteries to reduce peak energy demand. (1)*

*Companies with Demand Charges > \$15/kW can benefit...including more than one million customers in **Georgia, Colorado, Michigan, Texas, Florida and New England.***



Photo Source: Stem

Sources: (1) Bloomberg (2) NREL

Peak Energy Rates – Arizona Public Service

- Peak Rates up to **10x** off-peak rates
- Peak Rates apply during the sunniest times of the year

Energy Charge:

Peak: 49.4 ¢/kWh

Off-Peak: 5.2 ¢/kWh

June – August Billing Cycles
(Super Peak Summer)

\$0.49445 per kWh during Super-Peak hours, plus
\$0.24445 per kWh during On-Peak hours, plus
\$0.05254 per kWh during Off-Peak hours

May, September, and October Billing Cycles
(Summer)

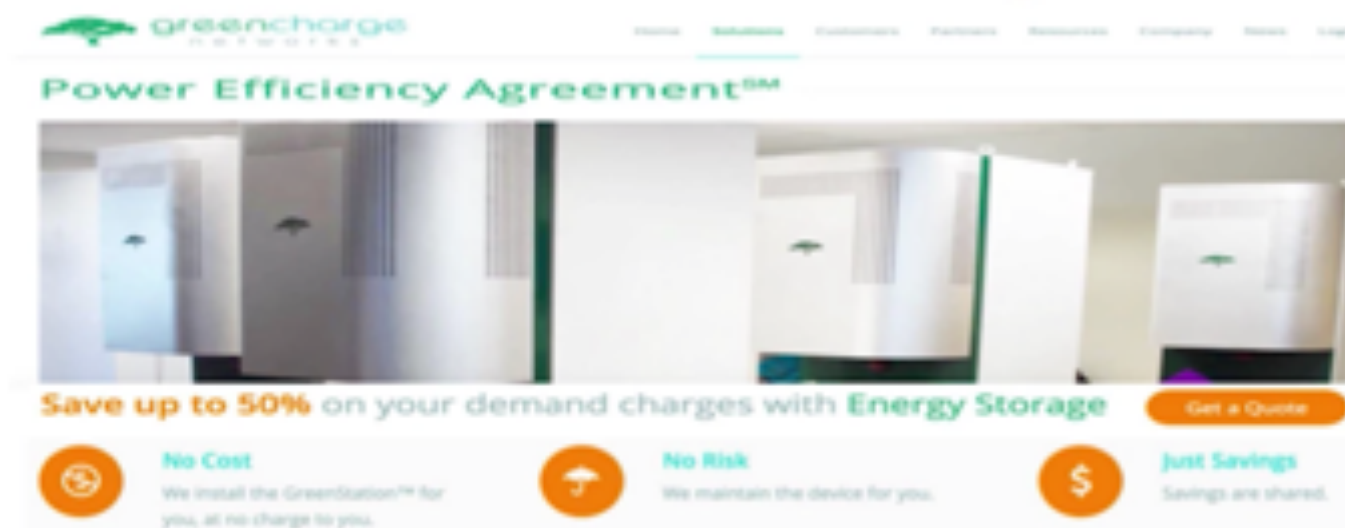
\$0.24445 per kWh during On-Peak hours, plus
\$0.05254 per kWh during Off-Peak hours

November – April Billing Cycles
(Winter)

\$0.19825 per kWh during On-Peak hours, plus
\$0.05253 per kWh during Off-Peak hours

- Residential Batteries -> 10x savings for consumers & huge hit on utility margins (even w/o solar)

Business Model Innovation: **Storage as a Service**



The screenshot shows the GreenCharge Networks website. At the top is the company logo and a navigation menu. Below the header is the title 'Power Efficiency AgreementSM'. A large image shows three white energy storage units. Below the image is the text 'Save up to 50% on your demand charges with Energy Storage' and a 'Get a Quote' button. Three key benefits are listed in orange circles: 'No Cost' (We install the GreenStationSM for you, at no charge to you), 'No Risk' (We maintain the device for you), and 'Just Savings' (Savings are shared).

- ▶ Many companies, including Stem and GreenCharge Networks offering **storage-as-service** to reduce **DEMAND CHARGES** for businesses
 - ▶ **Zero-money down**, 10 years
 - ▶ **Lower utility bills by 10-50%** (1)

Autonomous electric vehicles

...may spell the end of smokestack industries as we know them, and the beginning of successor industries. \$10b committed to development. Such cars should be widely available in 5 years, dominant in 10



CB Insights

May 18th,
2017

44⁸ Corporations Working on Autonomous Vehicles



CBINSIGHTS

www.cbinsights.com



Electric Vehicles

[+ Add to myFT](#)

Oil groups 'threatened' by electric cars

Fitch says investors could sell out of energy companies



25% of global corporate debt—\$3.4 trillion—is linked to utility- and auto-industry bonds that rely on fossil fuel activities

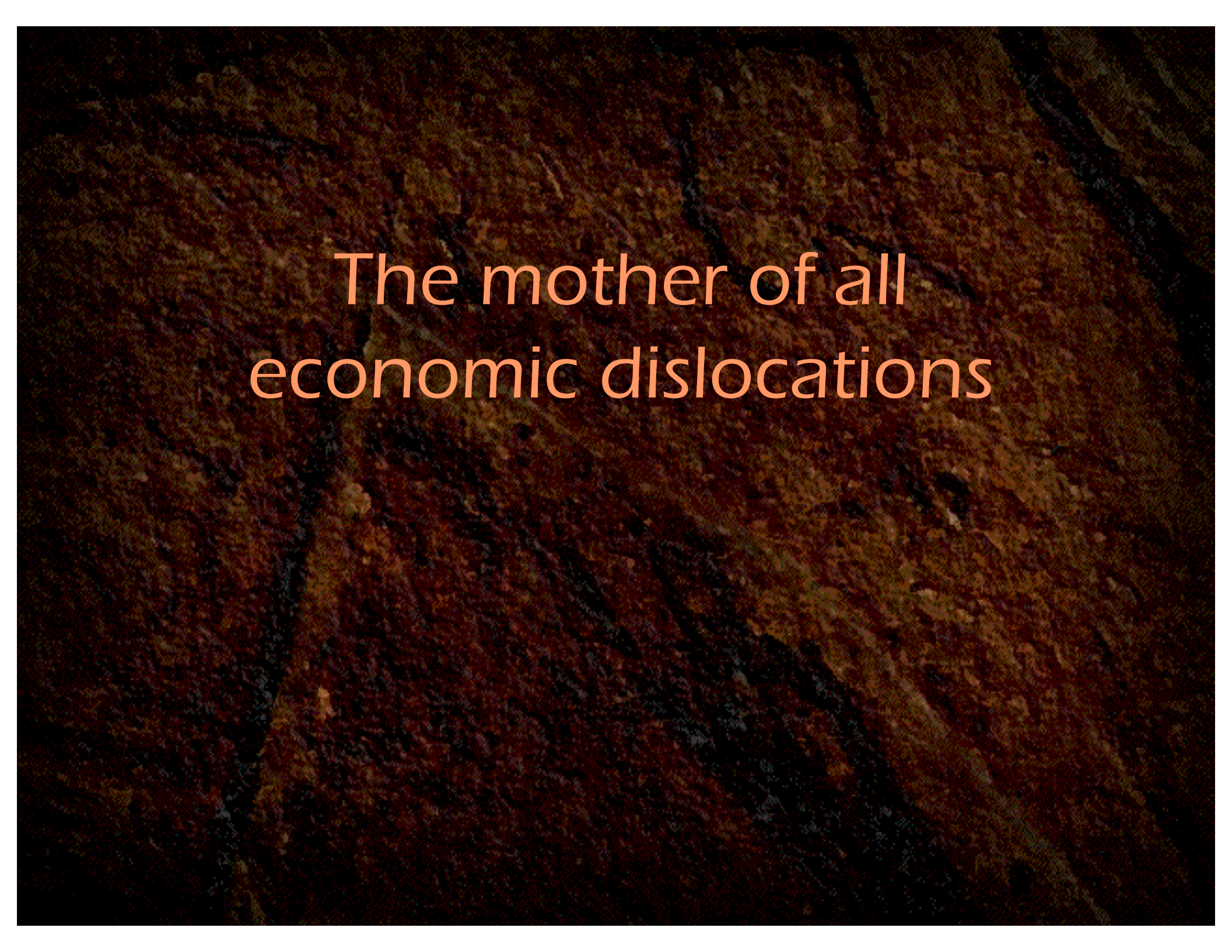
Batteries May Trip 'Death Spiral' in \$3.4 Trillion Credit Market

By **Brian Parkin**

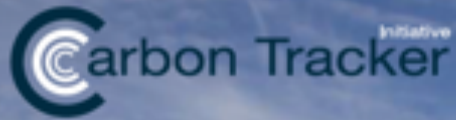
October 18, 2016, 8:44 AM MDT

-
- Energy storage technologies impact a quarter of corporate debt
 - Fitch urges utilities to diversify to limit risk of disruptive
-

Battery technologies starting to disrupt the electricity and automobile industries may also emerge as a trillion-dollar threat to credit markets, according to Fitch Ratings.



The mother of all
economic dislocations



2020 vision:

why you should see
peak fossil fuels coming

Author: Kingsmill Bond
September 2018

“The 2020s will be the decade of fossil fuel demand peaks, as one bastion of fossil fuel demand after another is stormed and overwhelmed by the rising renewable tide.”



April 2017 Kentucky Coal Museum installs solar because it's cheaper than buying coal fired power from the local utility

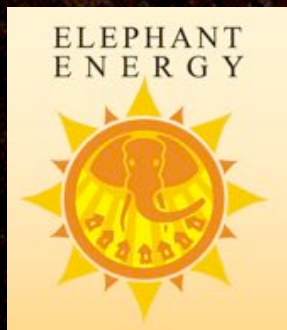
Energy Problems: Lighting

Africa

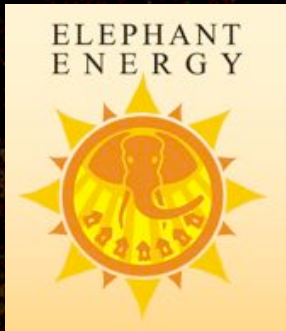
585 million live in sub-Saharan Africa

587 million w/o access to electricity

Typically spend N\$89/mo on energy
(20 – 40% of their income)



Elephant energy provides solar, efficient,
and inexpensive lighting solutions



Elephant Energy

First Energy shop – Katima Mulilo
Providing jobs selling solar at lower cost
than current energy



Most popular - Firefly 12 mobile cell
phone charger and light
N\$200 (US\$27)



Energy Problems: Cookstoves

- 3 billion people use solid fuel for cooking and heating world wide
- 1.6 million people die each year from cooking smoke
 - Most of them women and children
 - Most die from emphysema and other respiratory diseases (4% of global burden of disease)



Women carry 20 kg of fuel wood over 5 kilometers or more

CleanStar Ventures

Working to develop a fuel production system and train people in Mozambique to produce ethanol.

Farmers are expected to increase their daily income by a factor of 4-6 times.



Husk Power Systems Bihar India:



Rice husks common waste in rural India. Husk Power system uses these to create methane-like gas to fuel generators producing electricity for 300 to 500 households between 8 and 10 hours each day.

Added solar power - installed 75 mini power plants that power 25,000 households in more than 250 villages, impacting the lives of 150,000 people in rural India. They are expanding rapidly.



**200 to
300 million**

Indians don't have access to power.
India wants to **achieve universal
energy access** by 2022.



India wants

40 percent

of its power to come from **renewable
sources**—mostly solar—by 2030, up
from 18% today.



Part of its plan includes

10,000

**renewably-powered micro- and mini-
grids** with capacity of 500 megawatts
by 2022, mostly in rural areas.

In October 2019, India
canceled 14 GW of
planned coal expansion,
because solar had fallen in
cost

A 500-megawatt solar
facility was big at a tariff of
just 2.44 rupees —

A major coal-power utility
charges 3.2 rupees (about
31% higher).



Afghanistan has 32 MW of diesel generators

Solar prices
are falling
rapidly-



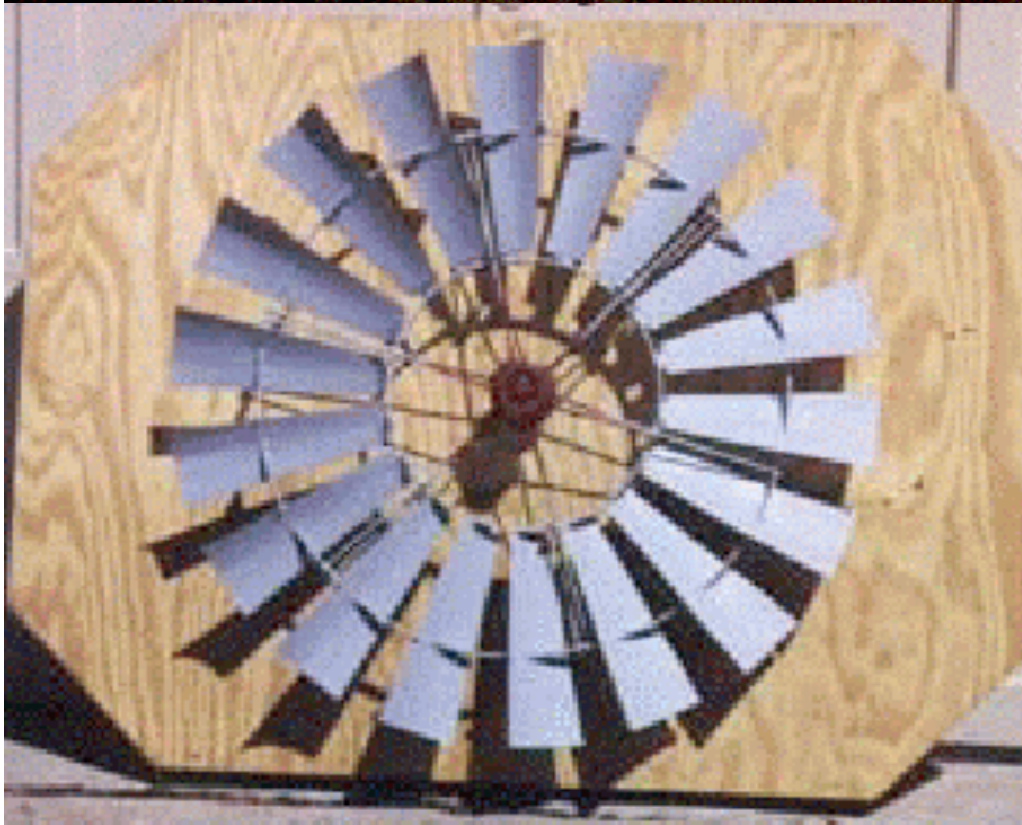
lead times far faster than
any conventional source

Wind is the fastest growing energy supply technology in the world:



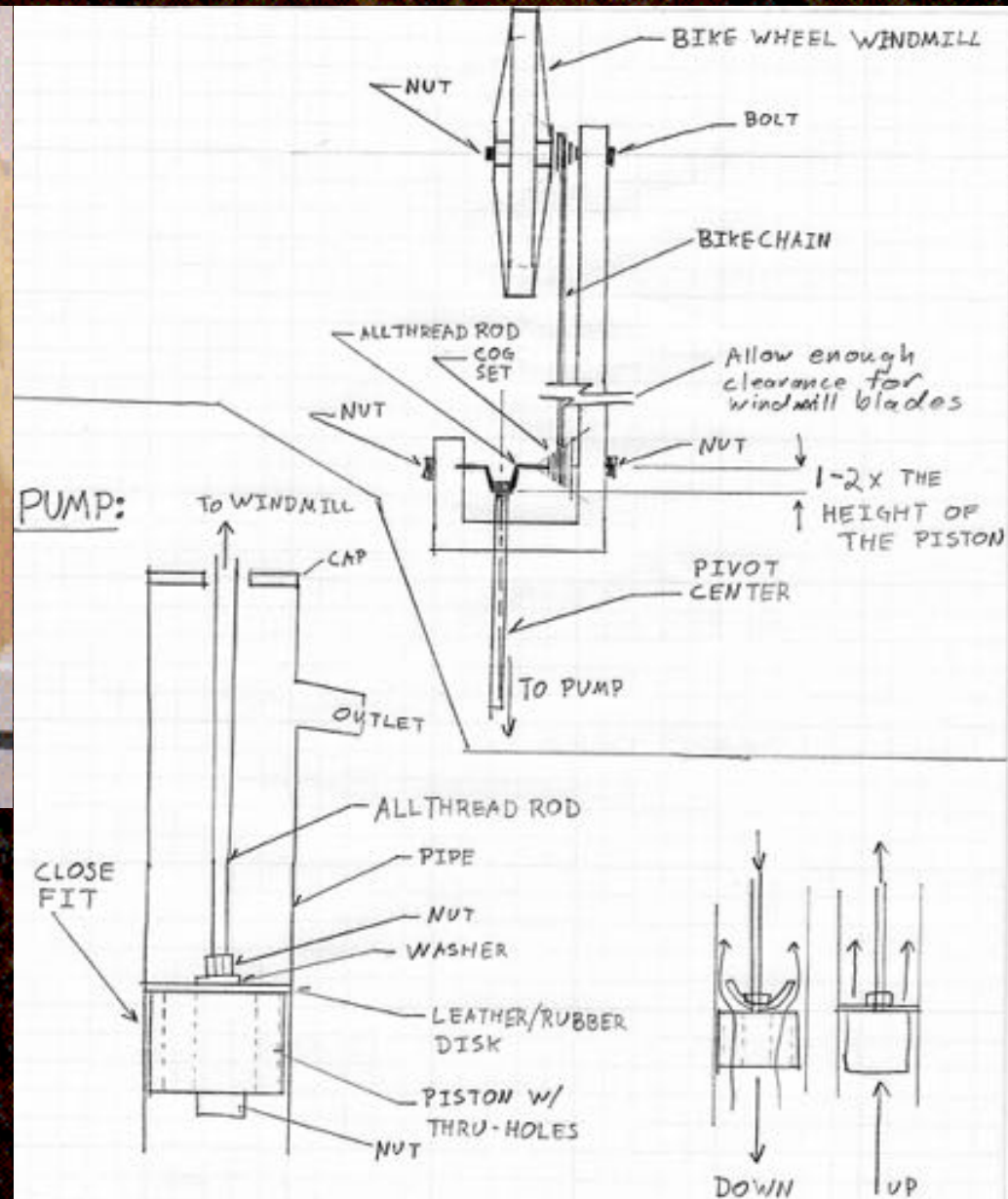
Wind in good sites costs 2¢/ kWh

PRT in Panjshir



Hunter:

These are really cool.
Hey, thanks,
Paul
@baf.afgn.army.mil>



Afghan Wind



<https://www.youtube.com/watch?v=QvPmlcb51Is>



Health Clinic, Panwar, Afghanistan



Military bringing renewables



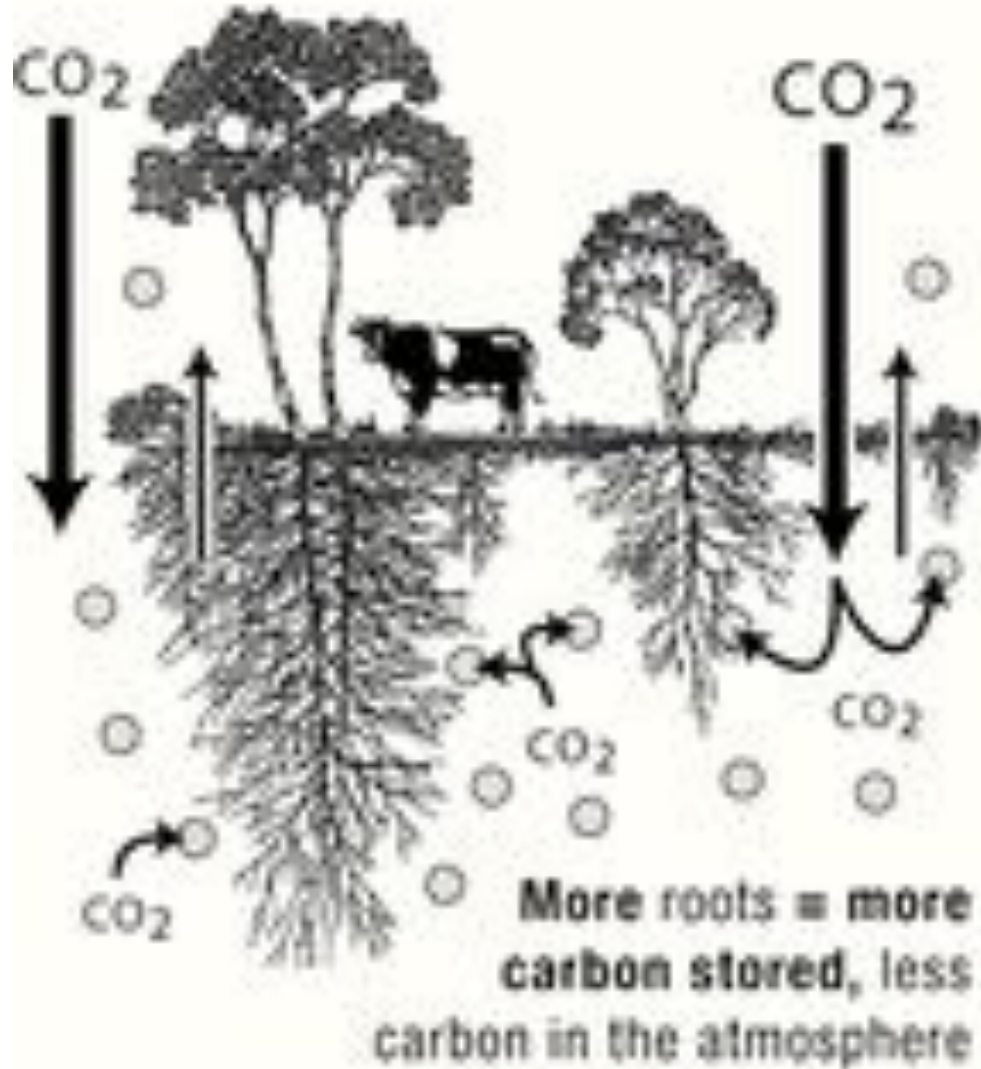
Military driving renewable deployment



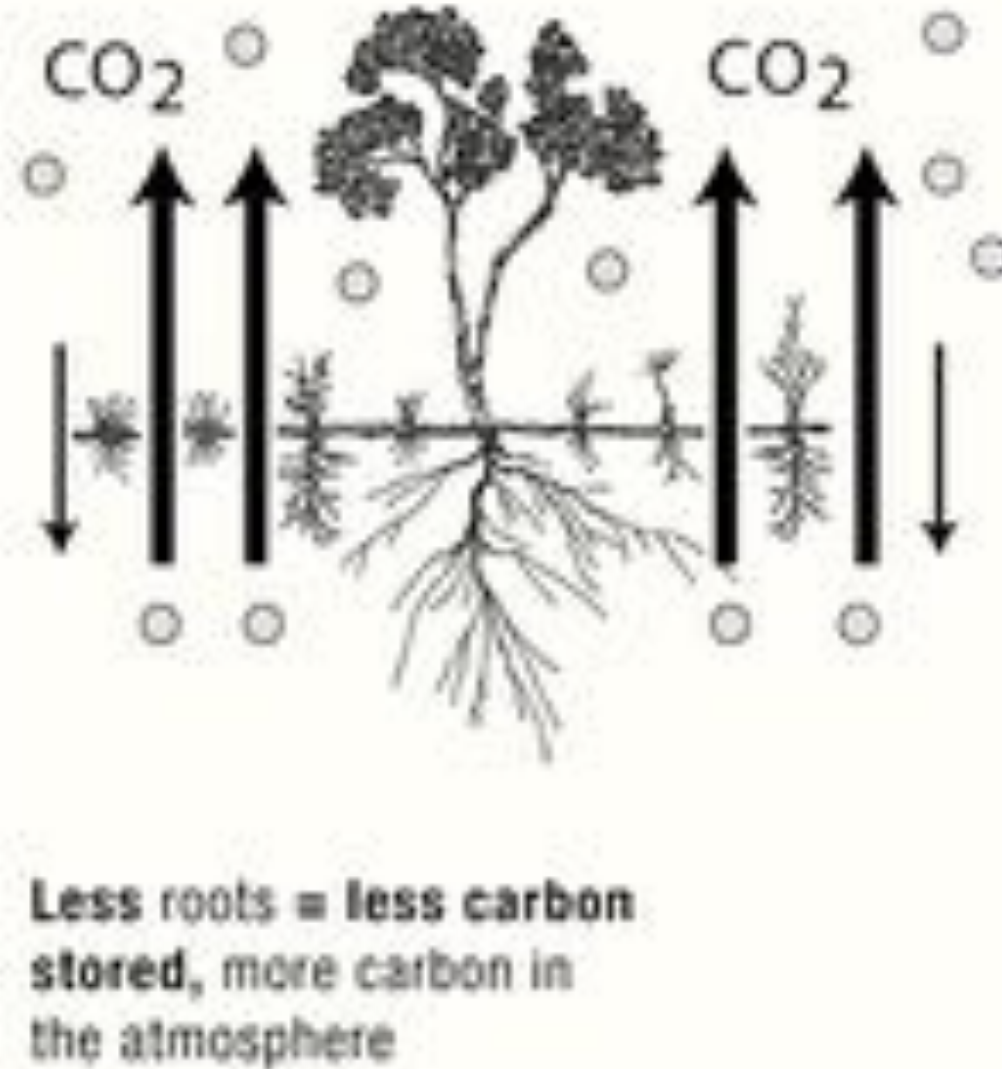
 simpliphi
power



Holistically Managed Land



Conventionally Managed Land



Regen
REGENERATIVE AGRICULTURE
UNITED KINGDOM

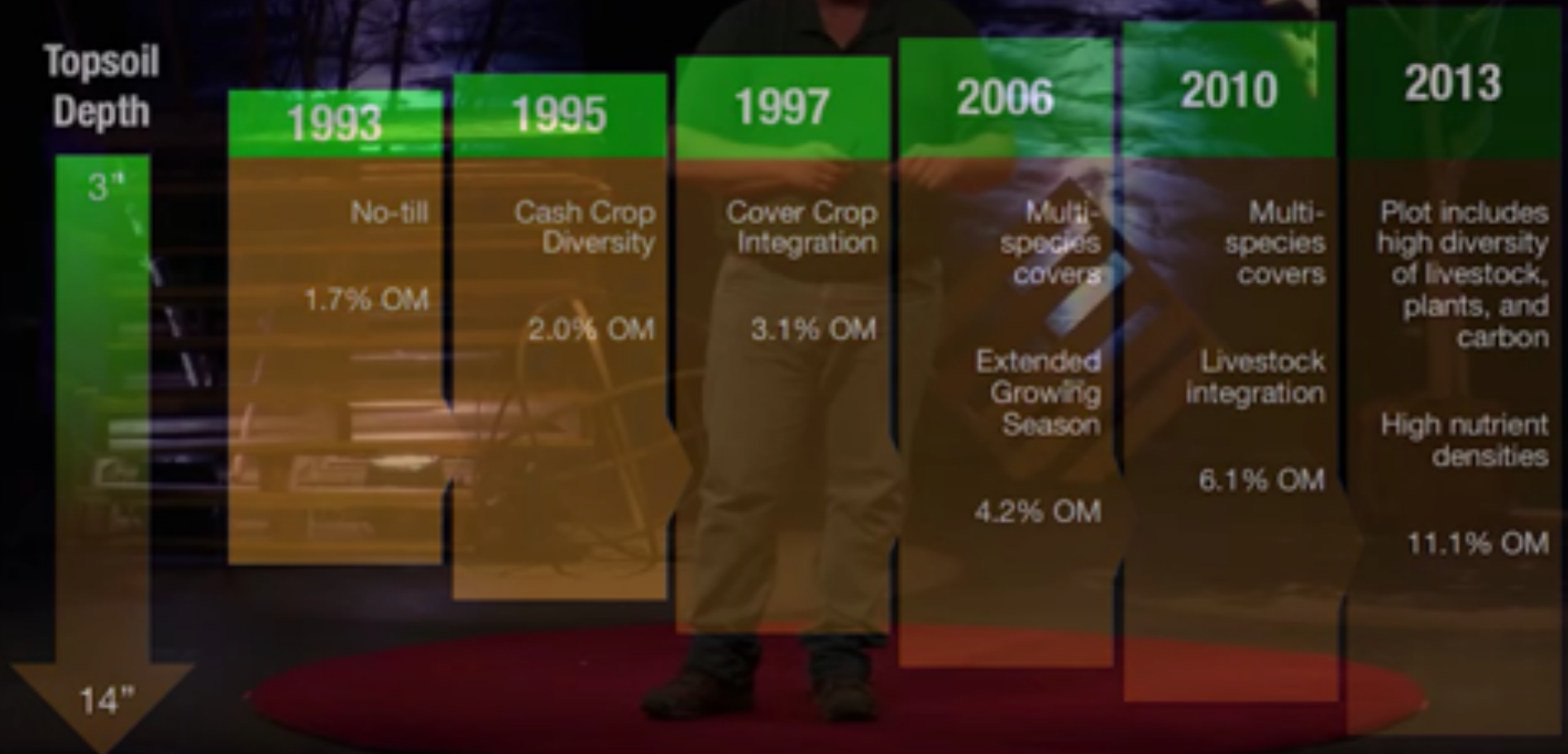


Healthy soils, plants, animals, people and profit





Brown's Ranch Soil Building



If you have healthy soil, you will have clean water, clean air, healthy plants animals and people – a healthy ecosystem



Long Root Ale





We are eliminating the greatest threat to humankind's existence. Now we need to regenerate our world, our communities

Why should I be studying
for a future that soon will
be no more...

...when no one is doing
anything whatsoever to
save that future?

“

Adults keep saying
“we owe it to the
young people to
give them hope.”

I don't want your
hope. I want you to act.

I want you to act as
if the house was on
fire...because it is.

GRETA THUNBERG
16-YEAR OLD CLIMATE ACTIVIST





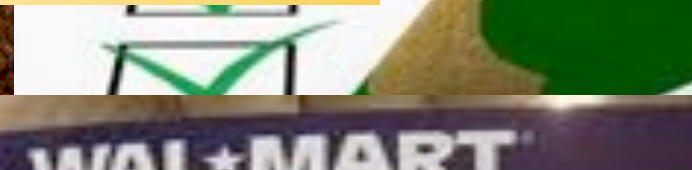
Natural Capitalism Solutions

LONGMONT, COLORADO

Email: solutions@natcapsolutions.org

Visit: www.natcapsolutions.org


Sustainability is happening



Nearly 70% of carbon dioxide & methane emissions can be attributed to 100 entities.

Half of this has been emitted since 1986





“Where capital goes over the next fifteen years is going to decide whether we’re actually able to address climate change and what kind of a century we are going to have,”

Christiana Figueres UN FCCC

Fossil Fuels Divestment

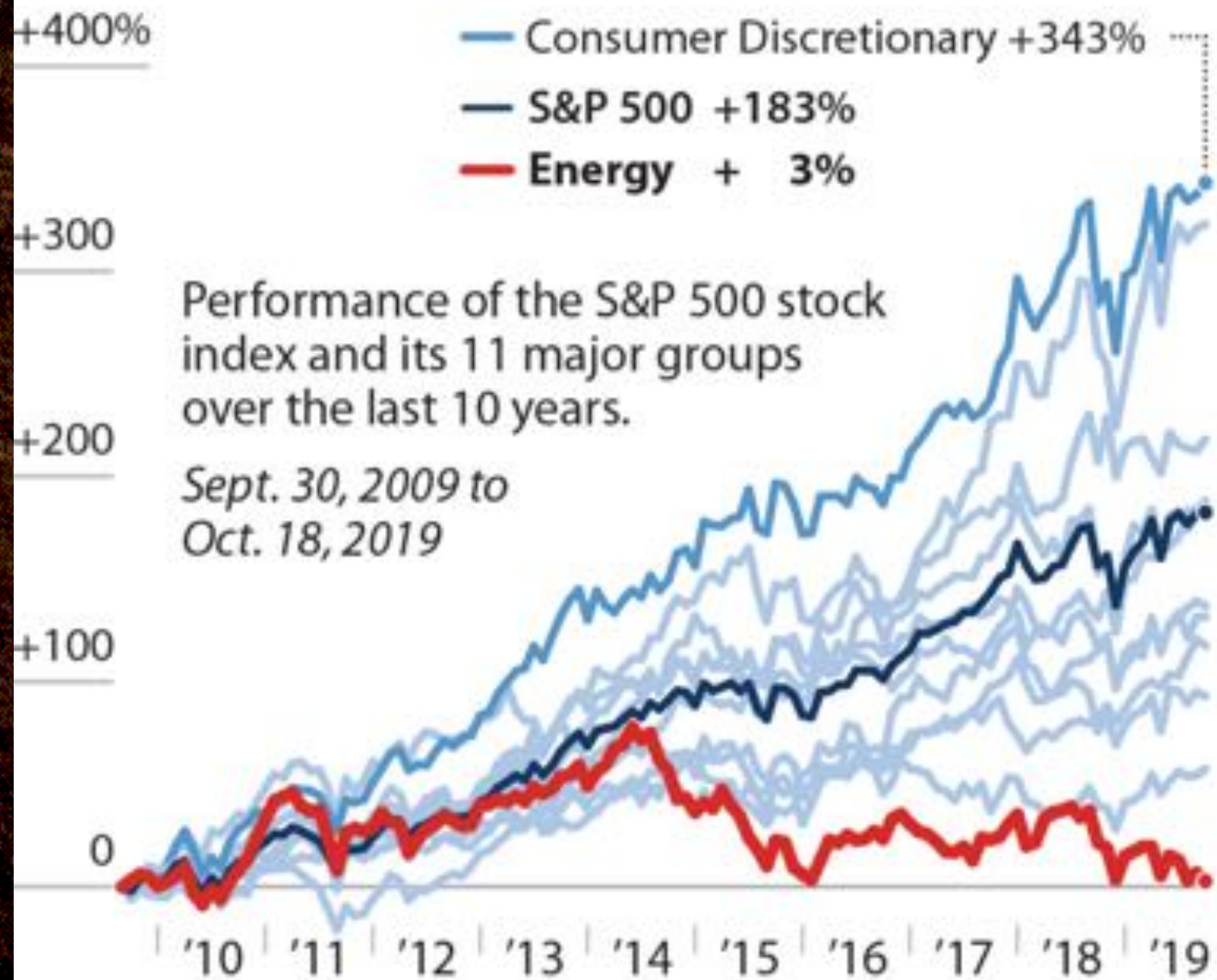
2018: \$6 trillion divested:



“It is entirely plausible, even predictable, that continuing to hold equities in fossil fuel companies will be ruled negligence.”

- Bevis Longstreth, former
Commissioner of the Securities
and Exchange Commission

Energy: S&P's Worst Sector Over 10 Years



Source: S&P Dow Jones Indices



CHANGE FINANCE

INVESTING IN SERVICE TO LIFE

Quality vs Innovation



Jack Welch saved GE \$12 billion with Six Sigma, grew stock value by firing people



Jeff Immelt made GE \$160 billion with Ecomagination since 2005

May 2007

Sales of GE's Ecomagination products doubled to \$12 billion in next two years, with back orders for \$50 billion more, "will blow away" the original goal of \$20 billion by 2010.

Overall sales at GE grew just over 20 per cent to \$163 billion.

GE reduced greenhouse gas emissions by 4% in 2006,

Original target 1% before 2012.

May 2010

Revenues rose to over \$25 billion in 2010.

GE to cut its emissions by 22 percent in 2009 compared to its initial goal of one percent in 2004.

By 2015 GE will cut energy intensity of its operations by 50%.

In annual letter to shareholders, Immelt reported:
"Ecomagination is one of our most successful cross-company business initiatives. If counted separately, 2009 ecomagination revenues would equal that of a Fortune 130 company and ecomagination revenue growth equals almost two times the company average."

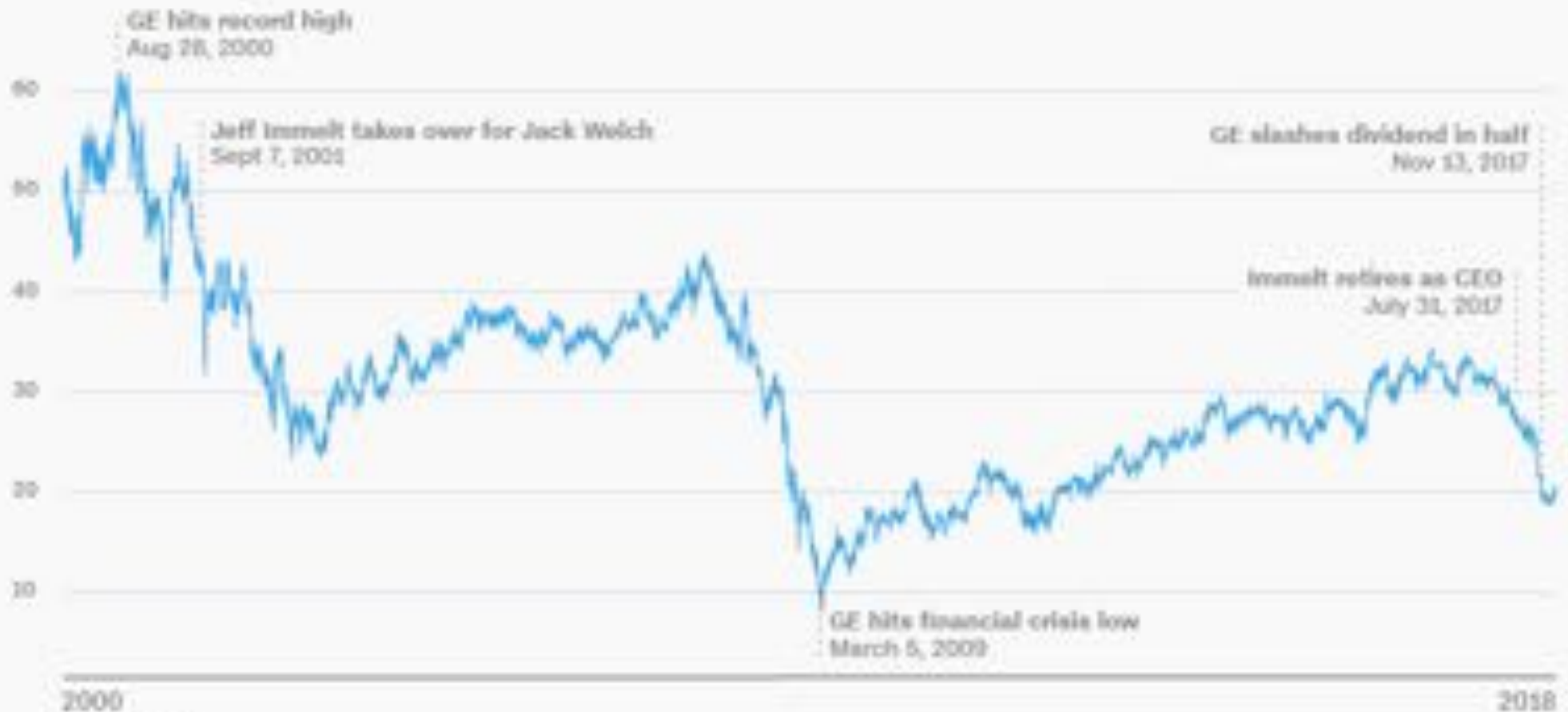
2010



"The 80 product lines in ecomagination tallied \$17 billion in sales last year, a 21% jump over 2007, even as most of the conglomerate's other divisions treaded water or went backwards.

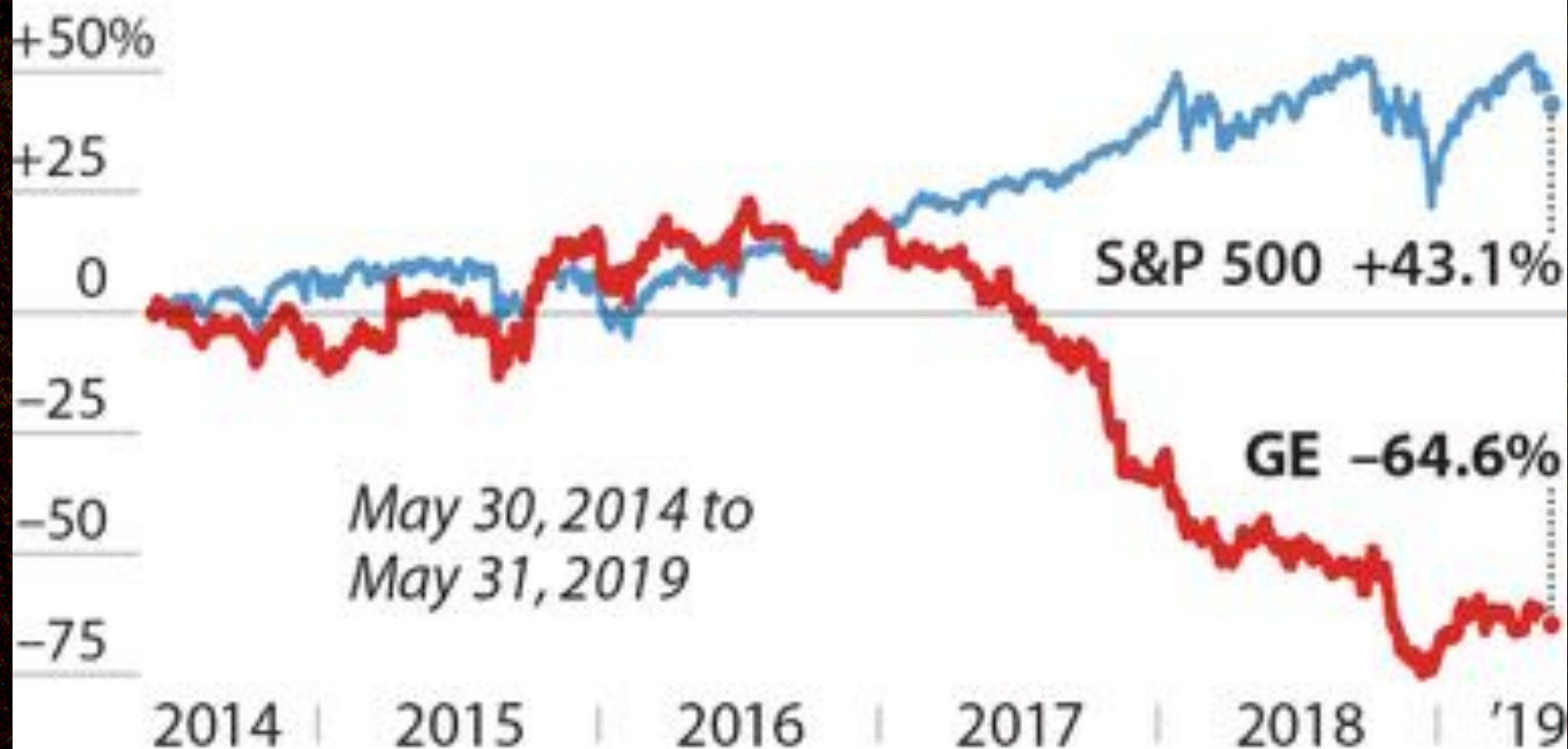
GE aimed for \$25 billion in sales in the unit that year, despite the tough economic environment."

GE's long decline



Source: Portfolio

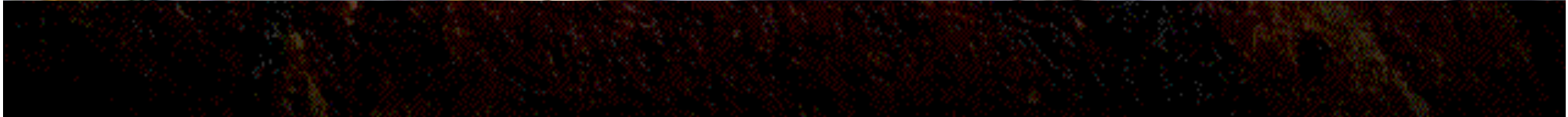
5-Year Performance of GE Shares vs S&P 500



Source: Nasdaq



Many of us fly. : How do we
get airline fuels?



Putting Carbon in the Circular Economy



Recycle



Make



Finer Future Force

The Chrysalis Process:
creation of imaginal cells



Transforming the Economy

Homo Sapiens is an interesting species.

We have incredible power to transform our environment to meet our needs, and yet we have this odd tendency to create a world, forget that we have created it, and then throw up our hands and proclaim our inability to change the system.

Capitalism is not a set of natural laws that Adam Smith discovered.

It is our creation, and it is constantly evolving and changing – consciously or unconsciously...

Regenerative Communities Network

Honors community and place



- 
- Active Hubs (7)
● Emerging Hubs (40+)

Emergence is how Life
creates radical change
and takes it to scale

- Margaret Wheatley

Digital Platform: Join Now!

<https://regencommunities.net>

In Metro Denver, cleantech employs 22,440, and is growing rapidly.

From 2012 to 2017, its labor force in Metro Denver grew by 20.5%, in 2017, it grew by 1%.

Fossil fuels employs 28,840. In Colorado 40,420

Fossil fuels shrank by 0.2% in 2017



Tech entrepreneuring:

IT and Software
industry in Metro
Denver employs
58,190 workers at
5,550 companies.

It contributes \$14
billion of economic
impact in Colorado

Outdoor Recreation in Colorado creates nearly four times as many direct jobs (229,000) as the oil and gas (40,420) and mining industries (19,000) combined”

“More Americans are directly employed by hunting and fishing (483,000) than oil and gas extraction (180,000).

Spending on snow sports delivers more American jobs (695,000) than the extractive industries in the United States (627,000)”



Naturally Boulder's "Natural and Organic Industry" member organizations contribute \$2.5 billion and 8,278 jobs (2011)

Slow food event next door to our office.

Neighbors meeting local farmers, exchanging seeds, joining CSAs



In Colorado, net farm income (industrial agriculture) in 2017 dropped to \$1.16 billion, down from \$1.23 billion in 2016.

“Of Colorado’s \$3.7 billion livestock industry, 75% comes from cattle and calves... Colorado is the fourth largest exporter of fresh and frozen beef in the United States” (Colorado Cattlemen's Association, 2018).





