

NATURAL CAPITALISM SOLUTIONS



MOTHER OF ALL DISRUPTIONS

A by L. Hunter Lovins
presentation @ NCS 2017



BREAKING NEWS

Saturday December 12, 2015

Historic Climate Change Agreement Adopted In Paris



Francois Mori/AP



United Nations
Climate Change Conference 2015
Paris, France

Nations Unies
Conférence sur les Changements Climatiques 2015
Paris, France

United Nations
Climate Change Conference 2015
Paris, France



Nations Unies
Conférence sur les Changements Climatiques 2015
Paris, France



PROPHECY...

“AS DEMOCRACY IS PERFECTED,
THE OFFICE OF THE PRESIDENT
REPRESENTS, MORE AND MORE
CLOSELY, THE INNER SOUL OF
THE PEOPLE. ON SOME GREAT
AND GLORIOUS DAY, THE PLAIN
FOLKS OF THE LAND WILL REACH
THEIR HEART’S DESIRE AT LAST,
AND THE WHITE HOUSE WILL BE
OCCUPIED BY A DOWNRIGHT
FOOL AND COMPLETE
NARCISSISTIC MORON.”

—H.L. MENCKEN

THE BALTIMORE EVENING SUN
JULY 26, 1920



Trump carried 20 of the 21 states with the largest per capita carbon emissions.

He routed Clinton in all 12 of the states at the top of the list, including Wyoming, North Dakota, West Virginia, Alaska, Louisiana, Montana, Kentucky, Indiana, Nebraska, Oklahoma, Iowa and Texas.

UNITED STATES CLIMATE ALLIANCE

STATES UNITED FOR CLIMATE ACTION



CALIFORNIA



COLORADO



CONNECTICUT



DELAWARE



HAWAII



MASSACHUSETTS



MINNESOTA



NEW YORK



NORTH CAROLINA



OREGON



PUERTO RICO



RHODE ISLAND



VERMONT



VIRGINIA



WASHINGTON

U.S. Climate Alliance
members represent

**MORE THAN
36%**

of the population of
the United States



U.S. Climate Alliance
members represent
at least

**\$7
TRILLION**

US dollars in GDP



U.S. Climate Alliance
members represent

**1.3
MILLION**

clean energy jobs*



*renewable energy & energy efficiency

Cut GHG emissions 15% - 2005 and 2015, vs 10% for the rest of the U.S. On track to meet Paris 26% reduction by 2025,

Economic output grew by 14% from 2005 to 2015, vs 12% for the rest of the country.

Trump Administration Won't Withdraw from Paris Climate Deal, EU Official Says

U.S. has stated it will 'not renegotiate the Paris accord' but will review its terms

[Emre Peker](#) Wall Street Journal, Sept. 16, 2017 5:01 p.m. ET



In a June 1 speech at the White House, President Donald Trump said the U.S. would leave the Paris climate accords. On Saturday, European Commissioner for Climate Action and Energy Miguel Arias Cañete said the U.S. won't withdraw from the deal. Photo: saul loeb/Agence France-Presse/Getty Images

Nov 4, 2020

Earliest the US can actually leave the Paris Accord. This is one day after the next election

January 2021

Even if the US leaves, a new president could, on Jan. 20, 2021, submit a written notice to the UN that the US would like to rejoin the Paris accord.

Within 30 days, the United States could re-enter the agreement and submit a new pledge for how the country plans to tackle climate change.

We Are Still In

14 states,
240+ cities,
~350 universities
1000+ companies
representing
120 million
Americans and
35% of carbon
emissions

 **Climate Central** 
@ClimateCentral

 Follow

More than 1,200 tech companies, states, cities and universities just said [#wearestillin](#) the Paris Agreement buff.ly/2rqQQz4

2:27 AM - Jun 18, 2017



State and Corporate Climate Action Just Got Serious

More than 1,200 businesses and states have reaffirmed their commitment to the Paris Agreement following Trump's decision to climatecentral.org

CLIMATE CHANGE URBAN SOLUTIONS

UN Climate Change Conference

PARIS NOV 30 - DEC 11 2015

UN-HABITAT AT COP21

Conférence sur les Changements Climatiques 2015

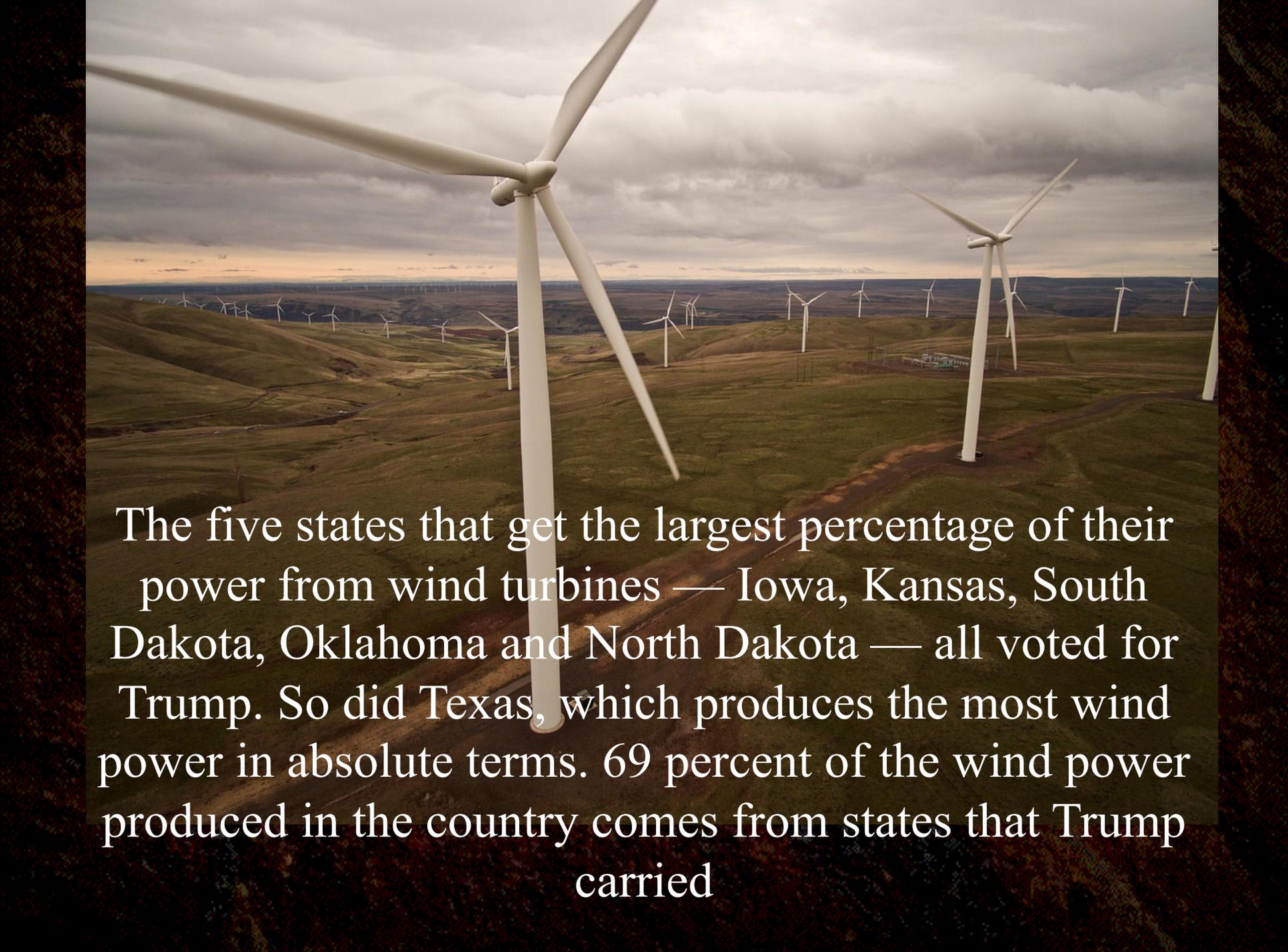


COP21/CMP11

Paris, France



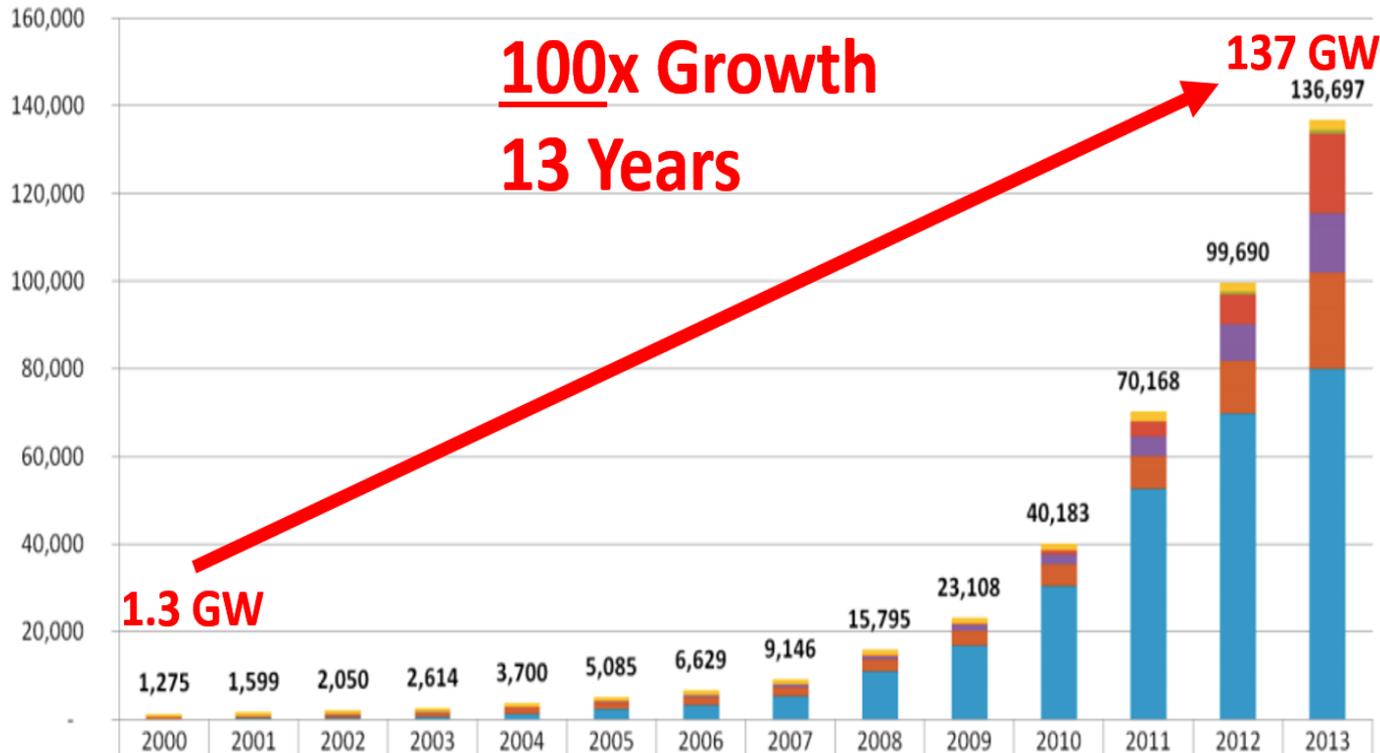
More than 1,000 cities committed to 100% renewable energy – urban environments responsible for 70% GHG and energy consumption



The five states that get the largest percentage of their power from wind turbines — Iowa, Kansas, South Dakota, Oklahoma and North Dakota — all voted for Trump. So did Texas, which produces the most wind power in absolute terms. 69 percent of the wind power produced in the country comes from states that Trump carried

Transition to the Next Economy

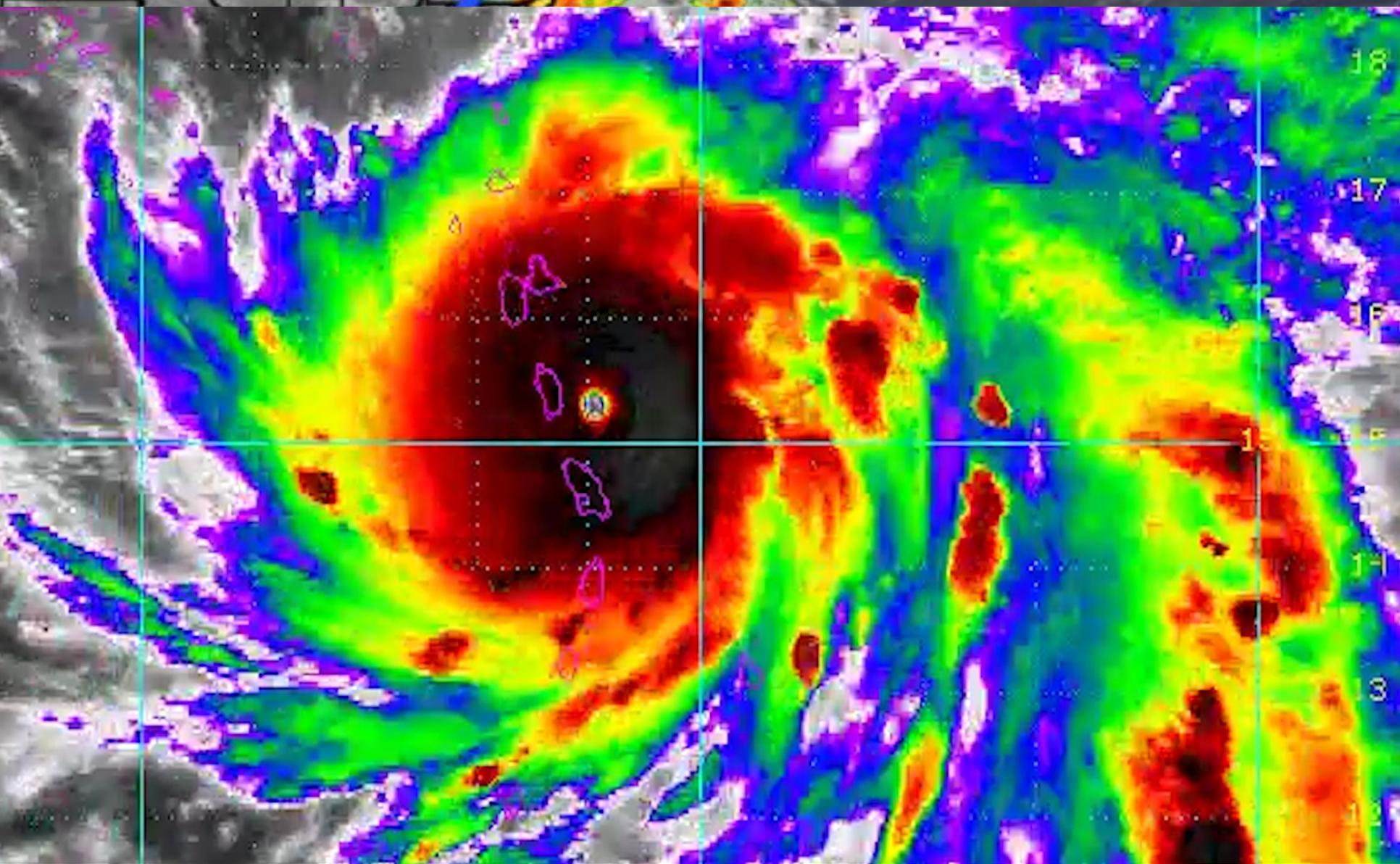
Evolution of global cumulative installed capacity 2000-2013 (MW)



A new solar array goes up in America every 150 seconds.

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
ROW	751	807	887	964	993	1,003	1,108	1,150	1,226	1,306	1,590	2,098	2,098	2,183
MEA	-	-	-	-	1	1	1	2	3	25	80	205	570	953
China	19	24	42	52	62	70	80	100	140	300	800	3,300	6,800	18,100
AMERICA	21	24	54	102	163	246	355	522	828	1,328	2,410	4,590	8,365	13,518
APAC	368	496	686	916	1,198	1,502	1,827	2,098	2,628	3,373	4,951	7,513	12,159	21,992
Europe	116	249	381	580	1,283	2,264	3,258	5,274	10,970	16,777	30,352	52,462	69,699	79,952
TOTAL	1,275	1,599	2,050	2,614	3,700	5,085	6,629	9,146	15,795	23,108	40,183	70,168	99,690	136,697

GOES-16 SATELLITE



Republican Mayor of Miami, Thomas Regalado

“This is the time to talk about climate change. This is the time that the President and the EPA and whoever makes decisions needs to talk about climate change. If this isn't climate change, I don't know what is. **This is a truly, truly poster child for what is to come.**”



That Sinking Feeling



Five of the top 10 global cities vulnerable to coastal flooding are in the U.S.

Estimated exposure \$1 trillion

"You never change things by fighting the existing reality.

To change something, build a new model that makes the existing model obsolete."

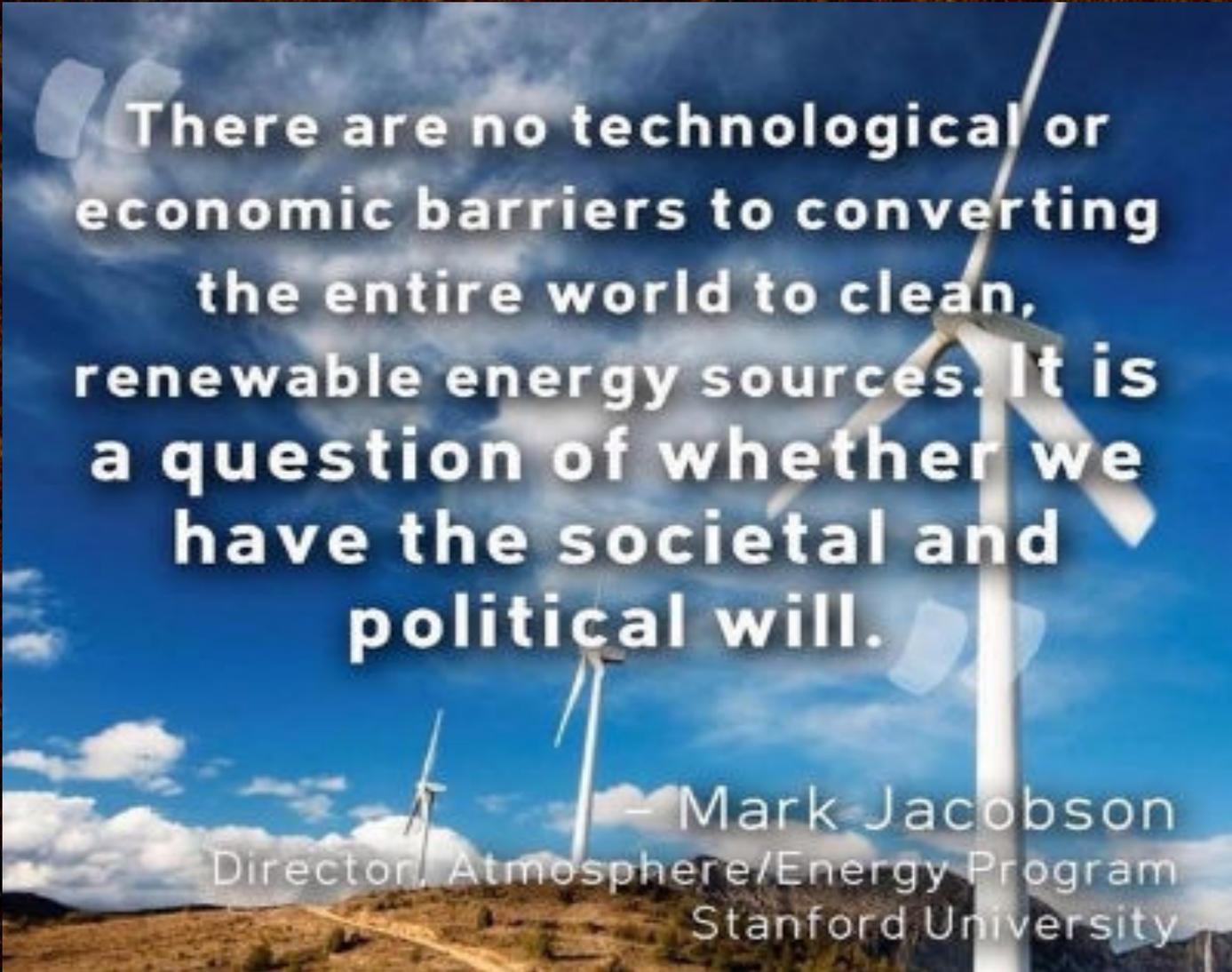
Buckminster Fuller



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 no technological or economic barriers to converting the entire world to clean, renewable energy sources. It is a question of whether we have the societal and political will.”

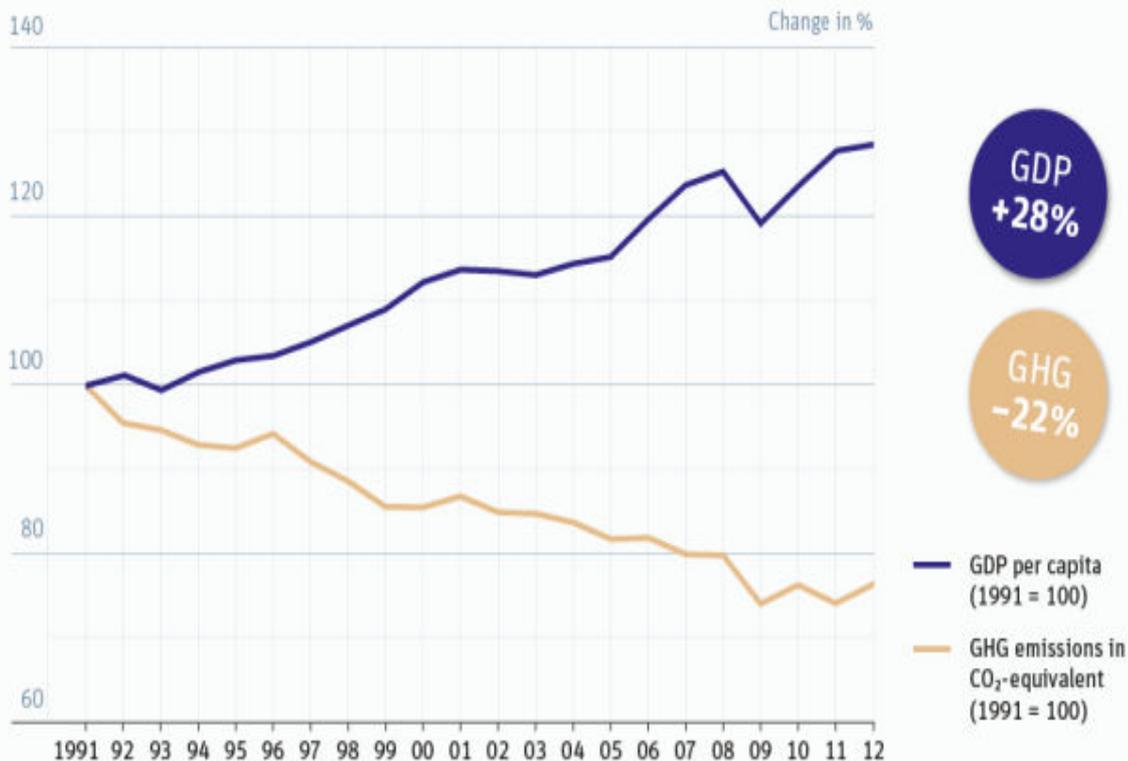
– Mark Jacobson
Director, Atmosphere/Energy Program
Stanford University

German Economics

Germany: growing economy, declining emissions

Change of Gross Domestic Product (GDP) and Greenhouse Gas (GHG) emissions in Germany, 1991-2012

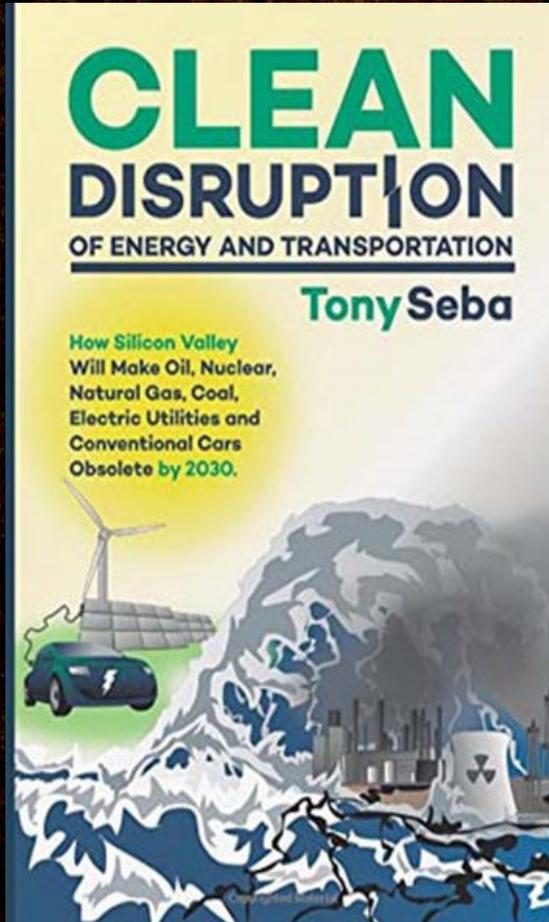
Source: BMU, BMWi, Destatis



Greenhouse
Gasses Down,
GDP Up.

Major industrial
economy now
fully engaged
in wholesale
transition to
renewables

How fast can a shift to renewables happen?



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





ENERGY DARWINISM

The Evolution of the Energy Industry

“This is the era of renewables”

“Alarming fall in cost of solar”

“Fossil fuels further up the cost curve are most at risk, and new projects built now will face competition with new technologies within the first quarter of their anticipated 25-year life. These project entail significantly more risk than is widely recognised”



National Bank
of Abu Dhabi:
Even at \$10 per
barrel, oil can't
match solar on
cost.

In the U.S. solar
jobs are growing
17 times the rest
of the economy

Solar will drop below two cents in 2017: GTM

By John Parnell | Apr 06, 2017 9:45 AM BST | 1

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The Saudi tender structure will be similar to those used with success in Dubai and Abu Dhabi. Credit: First Solar.

A solar power project is likely to register a per kWh price below two US cents at some stage during 2017, according to analysis firm GTM Research.

China has already installed 112 GW: more solar than they pledged to do in 2020. 45GW for 2017. Total German capacity is 41 GW





China just announced it will ban ICE cars.

Will launch world's biggest carbon market late 2017

So CA followed suit





Electric Vehicles

+ Add to myFT

Oil groups 'threatened' by electric cars

Fitch says investors could sell out of energy companies



How the world has changed



Tesla is valued at more than GM – despite producing 300 times fewer cars.

GM announced it is moving to

an all electric future



It's a battery company



Aliso Canyon Battery deployment



Tesla to the rescue



Quietly sending hundreds of powerwalls to Puerto Rico. Elon donated \$250,000 personally

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.

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

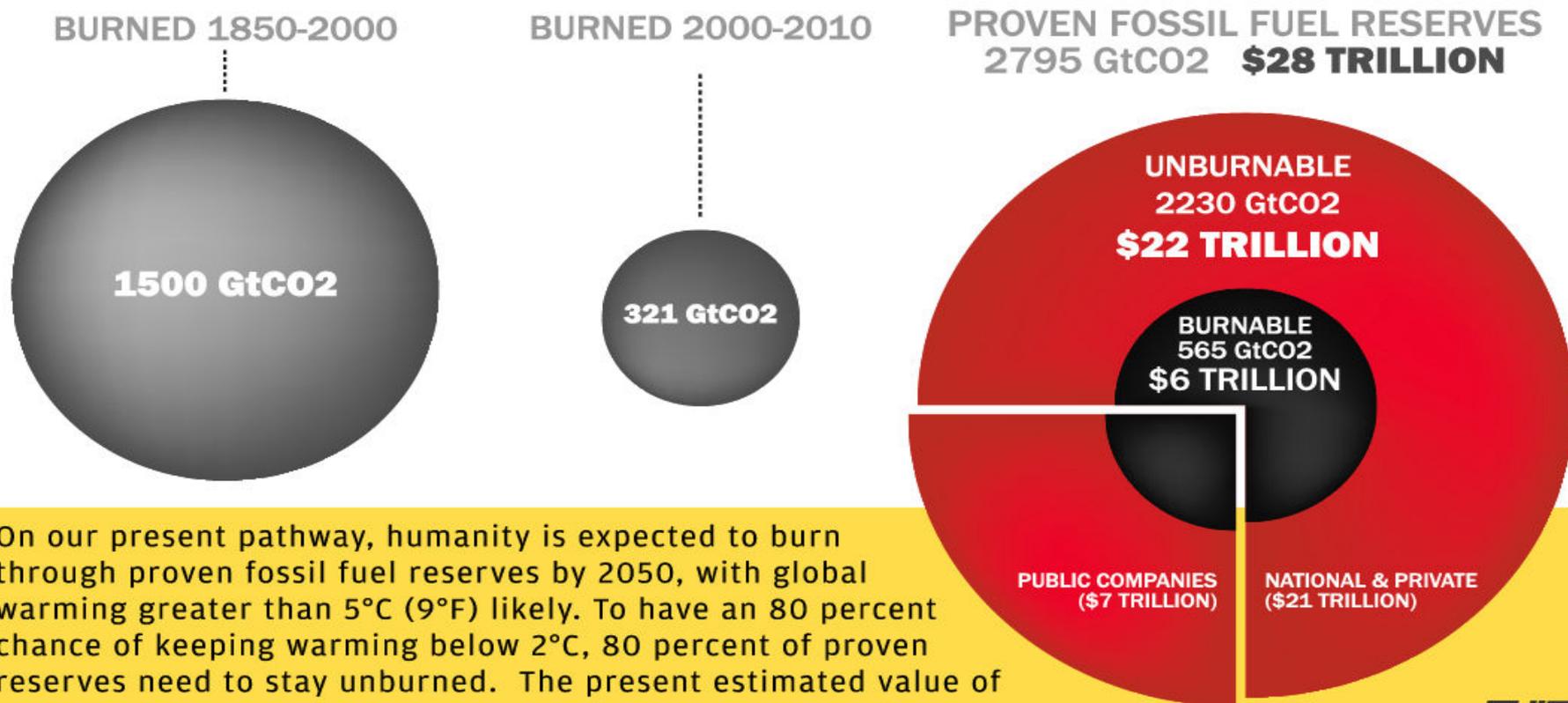
Autonomous electric vehicles

...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



Consequences: Financial Overshoot

THE **\$22 TRILLION** CARBON BUBBLE



On our present pathway, humanity is expected to burn through proven fossil fuel reserves by 2050, with global warming greater than 5°C (9°F) likely. To have an 80 percent chance of keeping warming below 2°C, 80 percent of proven reserves need to stay unburned. The present estimated value of these civilization-threatening reserves is approximately \$22 trillion.

**THINK
PROGRESS**

Significance of Oil and Gas Investments

- Late 1980's seven of top ten companies in SP 500 were oil and gas
- Today, only one – Exxon Mobil
- Exxon from 70's to early 90's drove the Standard and Poors Index
- From late 1990's to 2014 led the index, no longer dominated Since 2014 Exxon has lagged the SP 500
- Most Institutional Funds hold between 1.5% and 2.0% of Equities in Exxon. Additional Private Equity and Bonds.

Nearly two-thirds of carbon dioxide & methane emissions can be attributed to 90 entities.

Half of this has been emitted since 1986

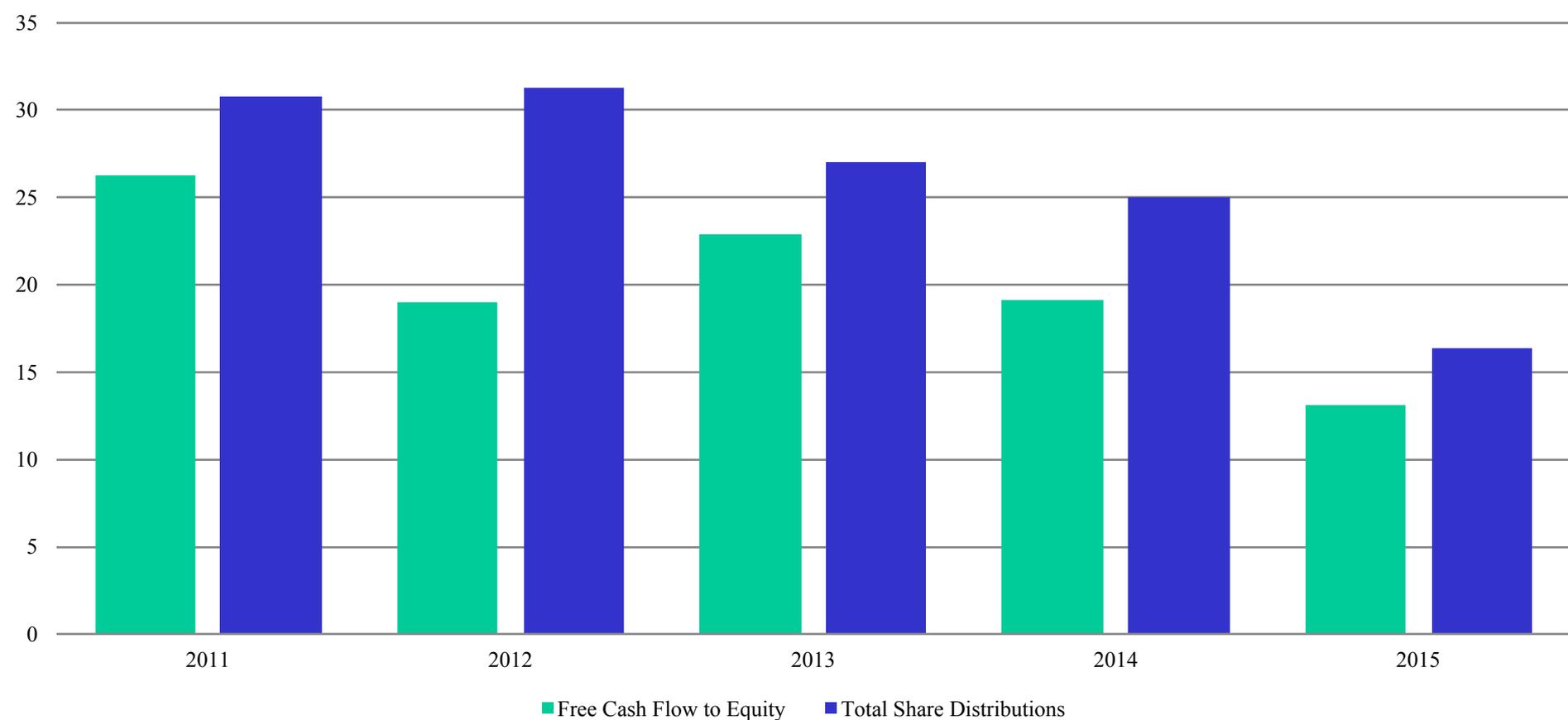


“Where capital goes over the next fifteen years is going to decide whether we’re actually able to address climate change and what kind of a century we are going to have,”

Christiana Figueres UN FCCC

Free Cash Flow to Equity Does Not Cover Shareholder Payouts

**Exxon: Free Cash Flow to Equity to Total Share Distributions
(2011-2015)**



Exxon Performance 2006-2011

	Trajectory	Peaks and Troughs
Revenues	Down	2011: \$486 billion; 2015: \$268 billion
Costs of Production	Up	Conv. +100%; Oil Sands: 50%; Syn: +33%
Net Income	Down	2008: \$45 billion; 2015 \$16 billion
Debt	Up	Average 2006-2013: \$8 bil; Today: \$29 bil
End of Year Cash	Down	2007:\$33.98 bil, 2015: \$3.7
Capital Investment	Down	2013: \$34 billion; 2015: \$26 billion

Fossil Fuels Divestment

Dec 2016: \$5 trillion divested:
Arabella Advisors



That is double the amount a year ago

“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

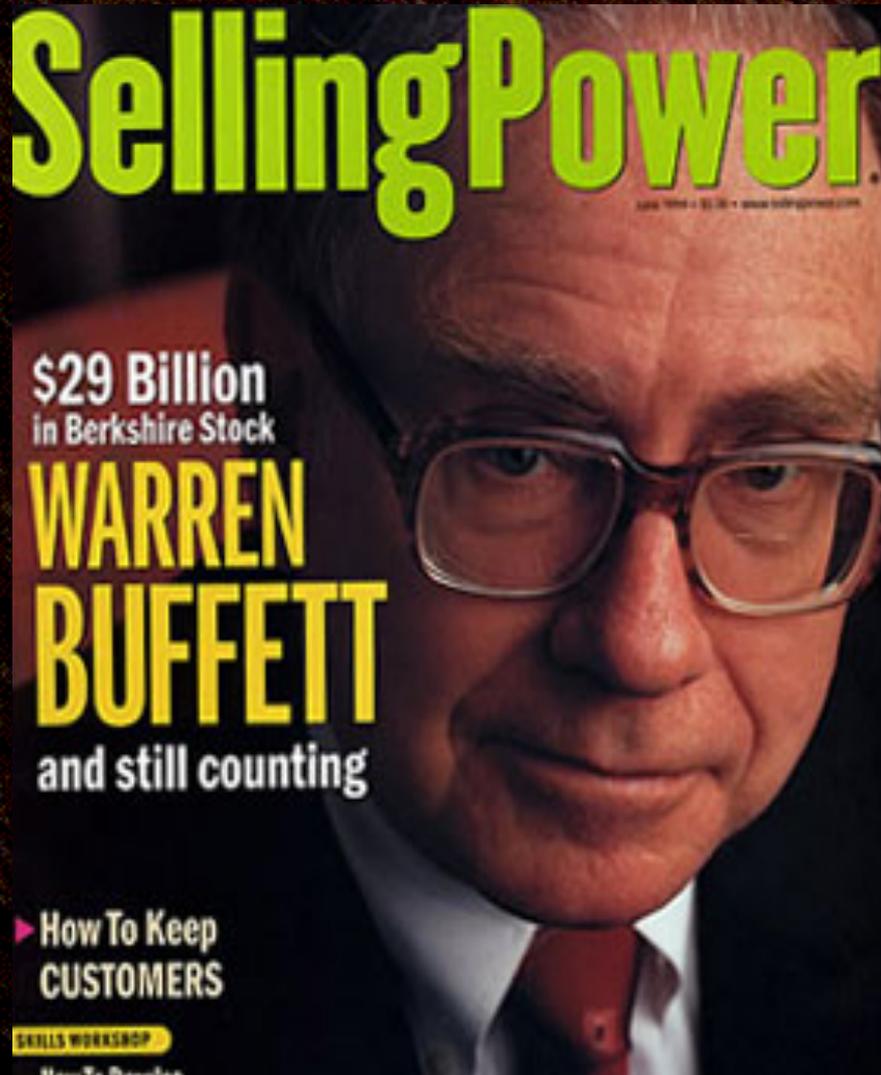
Divestment

Heirs of oil magnate John D. Rockefeller



Decided Sept 2015
to divest their family
fund of fossil-fuel
Investments

\$3.4 trillion pledged
to be divested before
Paris Climate COP



Warren Buffett dramatically cut Exxon, other fossil fuels shares.

Has close to 10% of Berkshire's market cap in renewables:

“The fuel is free.”



CHANGE FINANCE

INVESTING IN SERVICE TO LIFE

Moodys:

The commitment by the United States and more than 190 other countries to reduce their carbon pollution will “reshape the global financial landscape in terms of investment flows into clean energy”.

Moody’s estimates that as much as \$114 trillion in finance will be needed over the next 12 years for the clean energy transition.



Advanced energy is a \$1.4 trillion market



GLOBAL ADVANCED ENERGY MARKET



\$455.6 BILLION

advanced electricity generation



\$447 BILLION

advanced transportation



\$271.6 BILLION

building efficiency



\$118.1 BILLION

advanced fuel production



\$99.1 BILLION

electricity delivery and management



\$8.3 BILLION

advanced industry



\$953 MILLION

advanced fuel delivery

Global Revenue by Industry, 2016

Source: Navigant Research for Advanced Energy Economy



Unilever, Apple, Google, Ikea, Walmart....



Committed to be 100% renewably powered



UBS

BMW GROUP



Coca-Cola Enterprises

Bloomberg



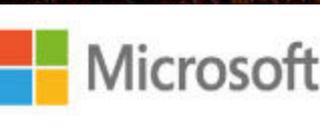
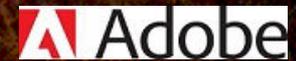
PHILIPS

Walmart



DIAGEO

MARS



Steelcase



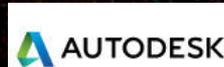
MARS



WELLS FARGO



PEARSON



Mars chief urges companies to ramp up climate change fight

Grant Reid says failure to hit Paris targets will be 'catastrophic for the planet'



2014 CDP report:

S&P 500 companies that build sustainability into their core strategies outperform those that fail to show leadership.

Corporations that are actively managing and planning for climate change secure an 18% higher return on investment (ROI) than companies that aren't
67% higher than companies who refuse to disclose their emissions.



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



We have achieved a universal legal agreement to limit future man-made climate change, the greatest existential threat to life on earth

A recent paper in Nature showed that to keep warming below 2 degrees C, emissions reduction is necessary, but that ways must be found to capture carbon and return it to the soil



“A mere 2 percent increase in the carbon content of the planet’s soils could offset 100 percent of all greenhouse gas emissions going into the atmosphere.”

—DR. RATTAN LAL, OHIO STATE SOIL SCIENTIST

nutiva®



<http://savory.global>

FACILITATING THE LARGE SCALE RESTORATION OF THE
WORLD'S GRASSLANDS





Wyoming – both taken same day



Left-side upstream, managed holistically - 260% stocking increase in 10 years

Right-side is downstream land managed 'conventionally'

How much carbon can be sequestered?

Marin Carbon Project – spreading compost: 1 metric ton per hectare per year

Adam Sacks: Climate Code Red: 1 ton per acre or more. Over the 12 billion acres of degraded land could pull 12 billion tons of carbon a year = 6 PPM. Even if add 2 PPM each year we will return to pre-industrial 280 PPM in 30 years

US DOE: natural sinks remove 2 gigatons a year. National labs believe can increase that $5x + 10$ gigatons = more than 50% of projected excess CO₂ that will have to be managed over the next century



Gabe Brown numbers

Runs cows, sheep, broiler hens (\$5 a pound for these) corn costs him \$1.35 to produce, it's now selling at ~\$3.50

Cannot keep up with demand

Started in 1993 with shallow soils, 1.3% organic matter.

In '95 started no-till, diversifying cash crop, using rotations. In 1997 focused on cover crops. In 2006 planting multi-species cover crops, mob grazing and different livestock species.

2013, have plot with 11.1% organic matter – can increase soil health fast

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



Long Root Ale



A finer future is possible

A world that works for 100% of humanity will arise from ensuring the dignity of all

We have all the technologies we need to solve all of the problems facing us: As William Gibson said: The future is already here, it's just not widely distributed.

There is enormous wealth to be made transforming how we deliver energy, grow our food, finance our industries....

A successful transition requires an inspiring vision of a future of greater wellbeing, deep engagement with nature and each other. This will overcome resistance to change because people want to belong to it

We CAN redefine and reform an economy that seeks only to maximize shareholder value to an economy in service to life





Each person must see himself as though the entire world were held in balance and any deed he may do could tip the scales

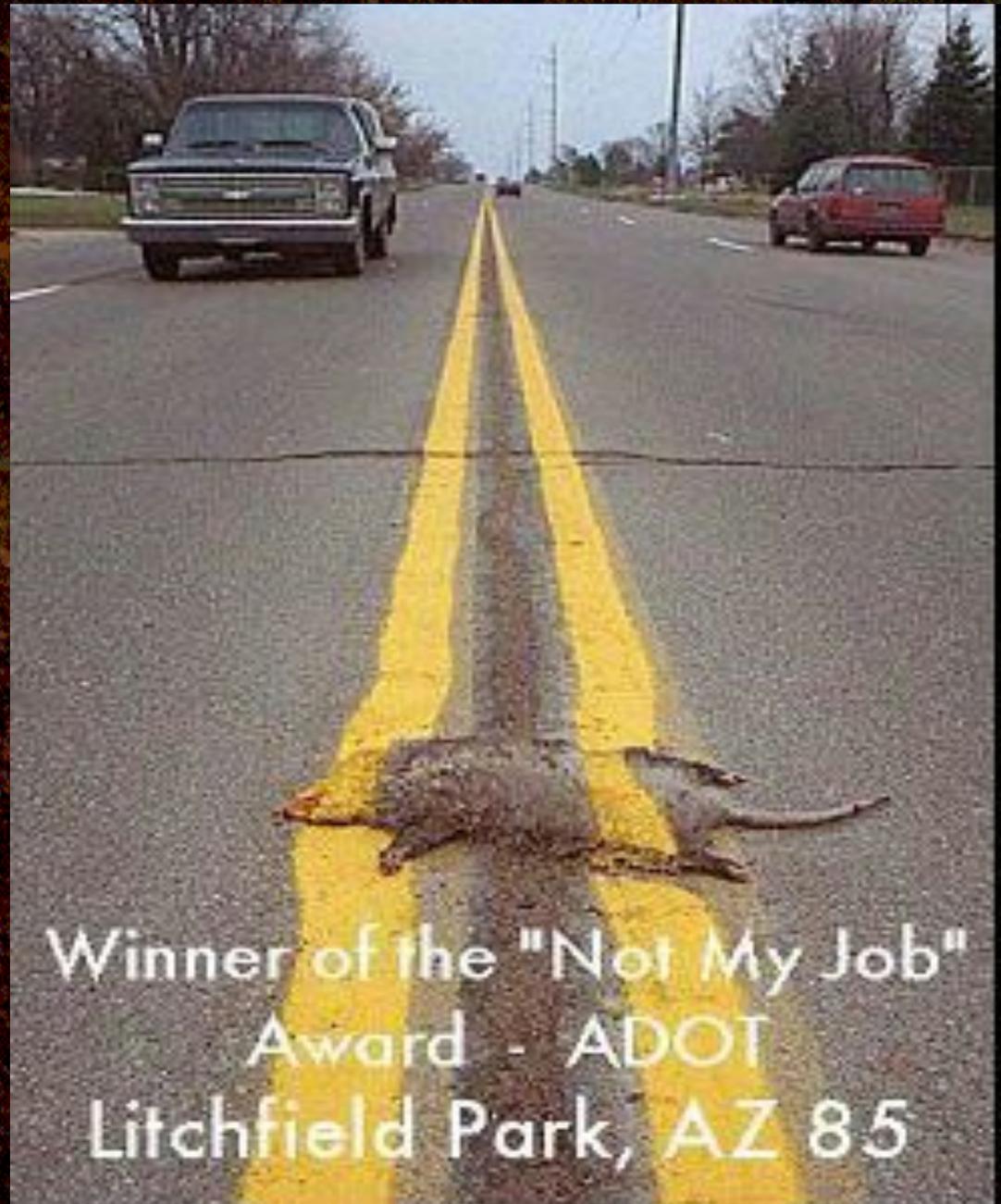
Maimonides



NATURAL CAPITALISM SOLUTIONS

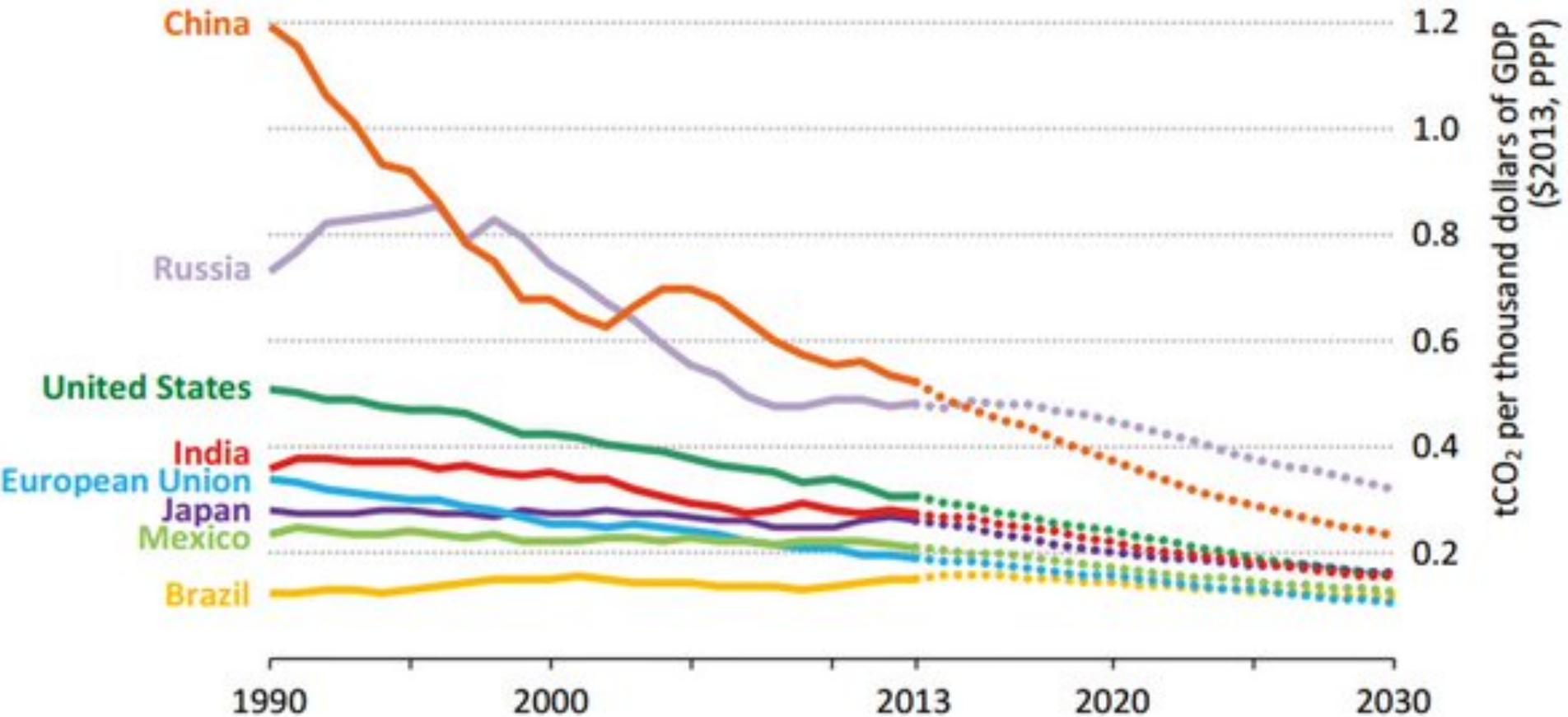
Visit: www.natcapsolutions.org

Who is
responsible?



Winner of the "Not My Job"
Award - ADOT
Litchfield Park, AZ 85

Carbon intensity to date and projected under INDC scenario based on country pledges



Source: IEA (2015). World Energy Outlook Special Report 2015: Energy and Climate Change.

Amount of carbon emitted per unit of GDP is declining around the world

Dr. Anders Wijkman



A study report at the request of the Club of Rome
with support from the MAVA Foundation



The Circular Economy and Benefits for Society Jobs and Climate Clear Winners in an Economy Based on Renewable Energy and Resource Efficiency

A study pertaining to Finland, France, the Netherlands, Spain and Sweden

Authors: Anders Wijkman and Kristian Skånberg

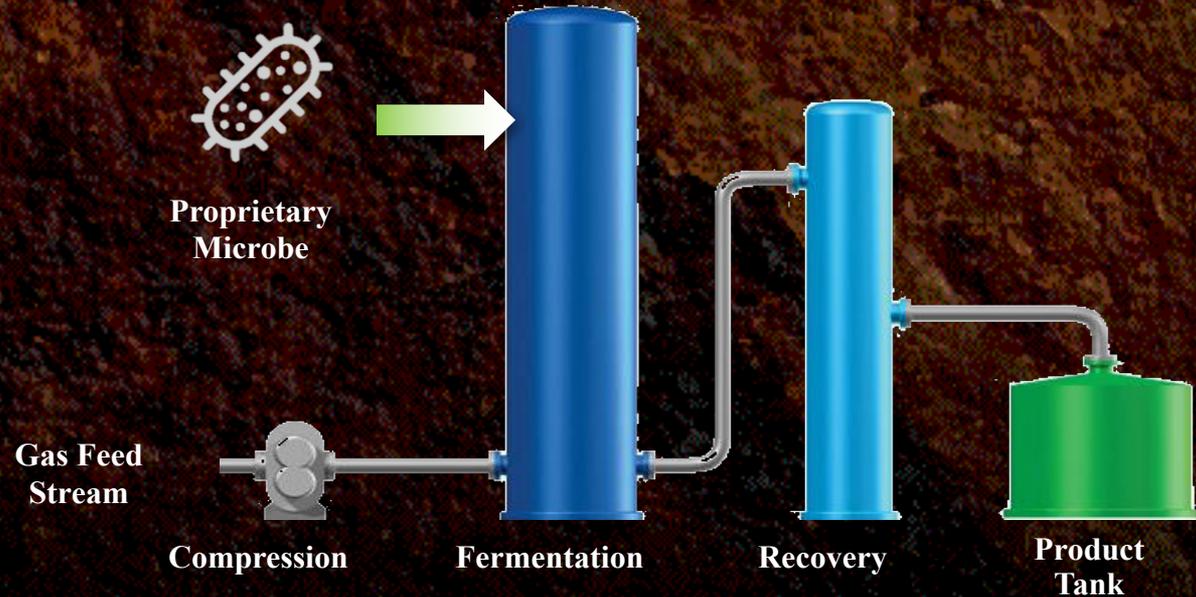
Modelling: Kristian Skånberg and Mårten Berglund

LanzaTech

Capturing carbon, fueling growth



- ✓ Steel
- ✓ Refining
- ✓ Ferroalloy





LanzaTech

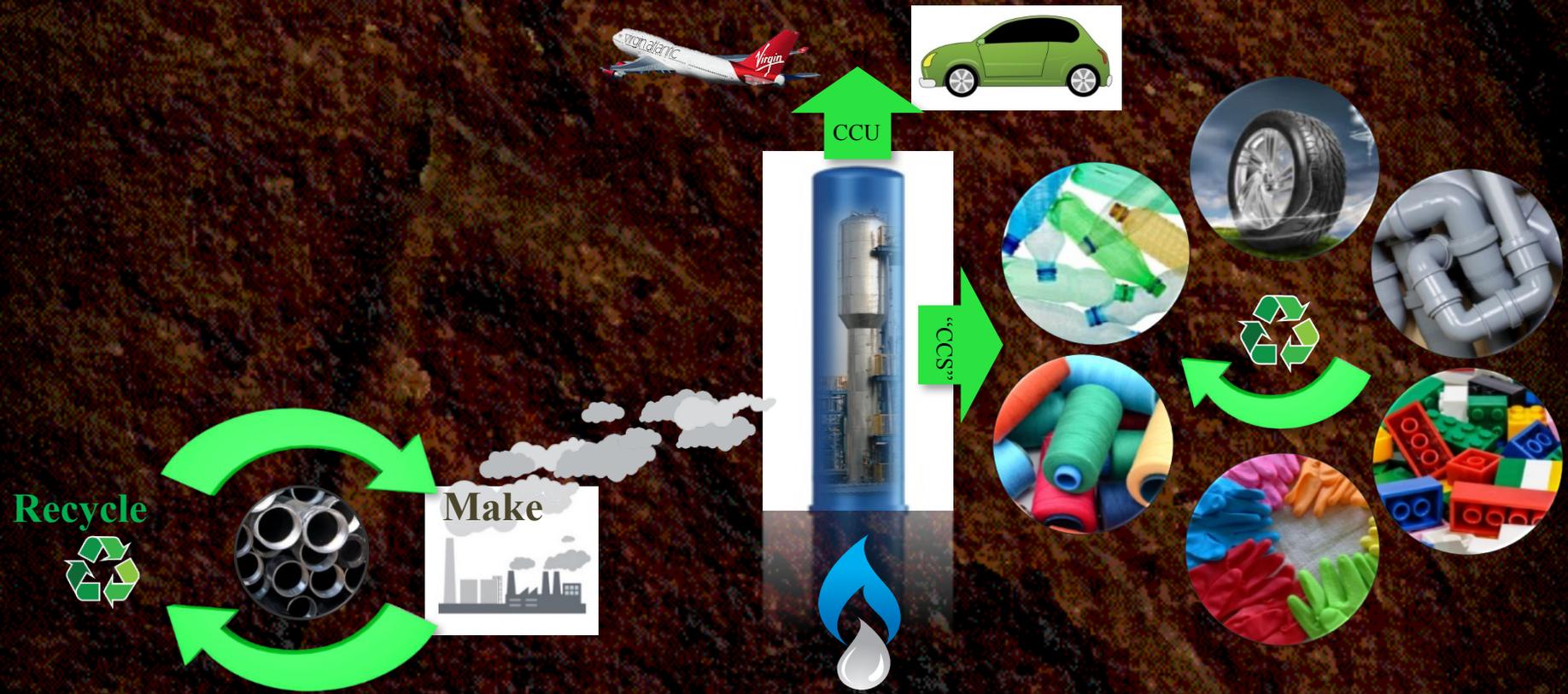
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Dow
EVONIK INDUSTRIES

BOEING
HSBC
U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

virgin atlantic
Pacific Northwest NATIONAL LABORATORY

首钢朗泽 Shougang LanzaTech
ArcelorMittal
2017 2018

Enabling the Circular Economy





We're still going to need airline
fuels

e.on



RWWE



95% of experts on the economics of climate change said U.S. should follow through on Paris pledges.

NYU economists calculated that climate policies of other nations have already benefited the U.S. economy by more than \$200 billion.

The pledges other nations have made in the Paris climate accord could save the United States more than \$2 trillion by 2030 and more than \$10 trillion by 2050.

How to transform finance



The Fortune
1000 drives
about 50% of
the global
economy.
Their cap-ex
budget drives
half of global
impact

Global 1000 firms & many smaller imitators collectively hold the fate of humanity in their hands. They are trapped in the grip of short-term financial speculators and passive index investors, neither of whom are part of the, regenerative financial system we need.

Imagine big pension funds & endowments investing in and genuinely owning, with like-minded steward investors, with all associated responsibilities and benefits, 10 or 20% of real enterprises over the long run.

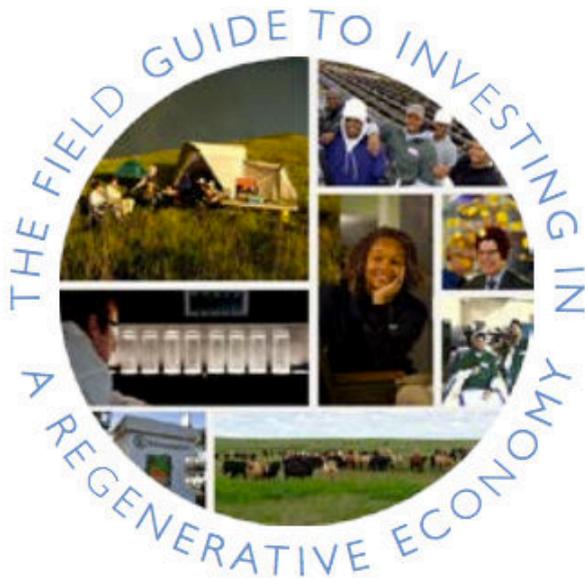
Financial obligations met out of enterprise cash flows, rather than “total return” of speculative portfolios of securities that are at the whim of boom - bust cycles caused by the excess of (their own) speculative capital in the system.

There's no place for self-serving interests of predatory Wall Street agents who extract endless and egregious fees through needless and non-value adding transactions: trading shares in a speculative frenzy, buying, selling, merging, leveraging, and recapitalizing companies.



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THE FUTURE OF FINANCE



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Food Trends

1. Locally sourced meats and seafood
2. Locally grown produce
3. Environmental sustainability
4. Healthful kids' meals
5. Natural ingredients/minimally processed food
6. New cuts of meat
7. Hyper-local sourcing
8. Sustainable seafood
9. Food waste reduction/management
10. Farm/estate branded items

2013 UNCTAD report

Modern industrial agriculture has not ended hunger and is particularly vulnerable to climate change

Small-holder peasant farmers could easily feed the populations of developing countries with existing labor-intensive, environmentally friendly agricultural technologies—were it not for corruption, extreme inequality, and misguided attempts to impose inappropriate “modern” crops and techniques.



Thomas Berry says:

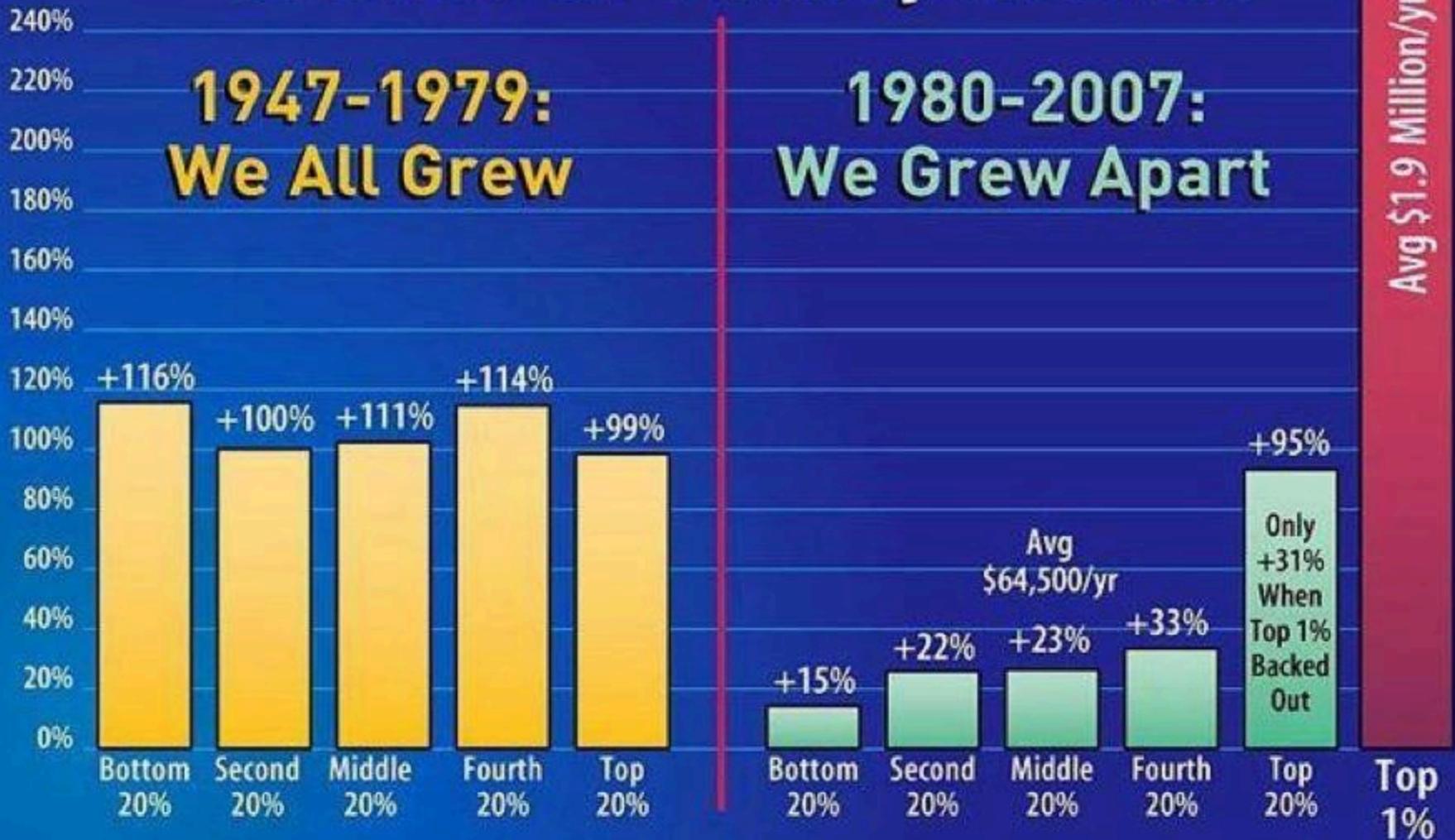
“We are in trouble just now because we do not have a good story....

The old story - the account of how the world came to be and how we fit into it...sustained us for a long period of time. It shaped our emotional attitudes, provided us with a life purpose, energized action. It consecrated suffering, integrated knowledge, guided education....

We need a (new) story that will educate man, heal him, guide him”

Growth Of Family Income

+261%



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

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Inequality

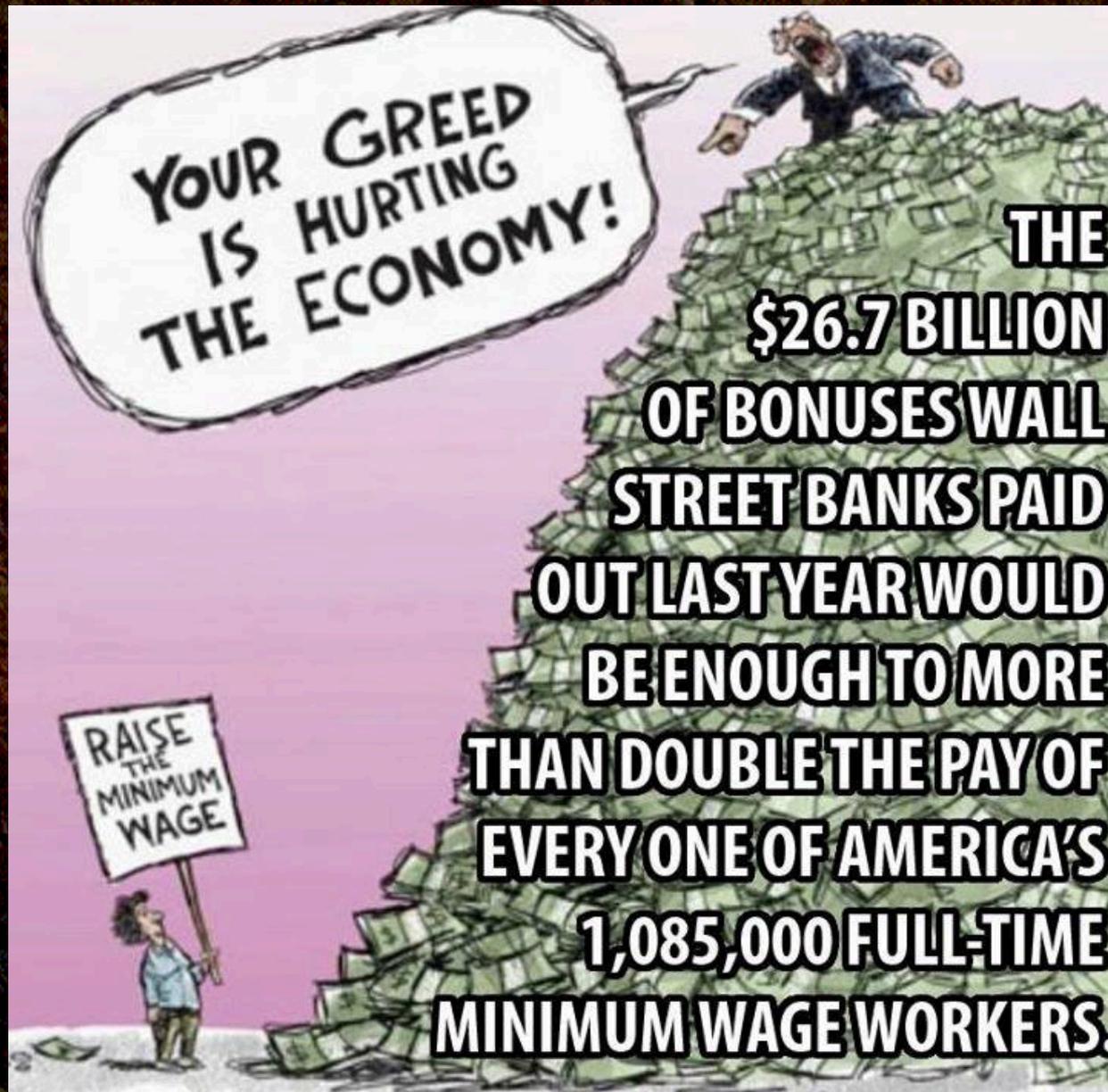


**THE
8
RICHEST
PEOPLE
OWN THE SAME
WEALTH AS THE
3.5 BILLION
POOREST PEOPLE.**



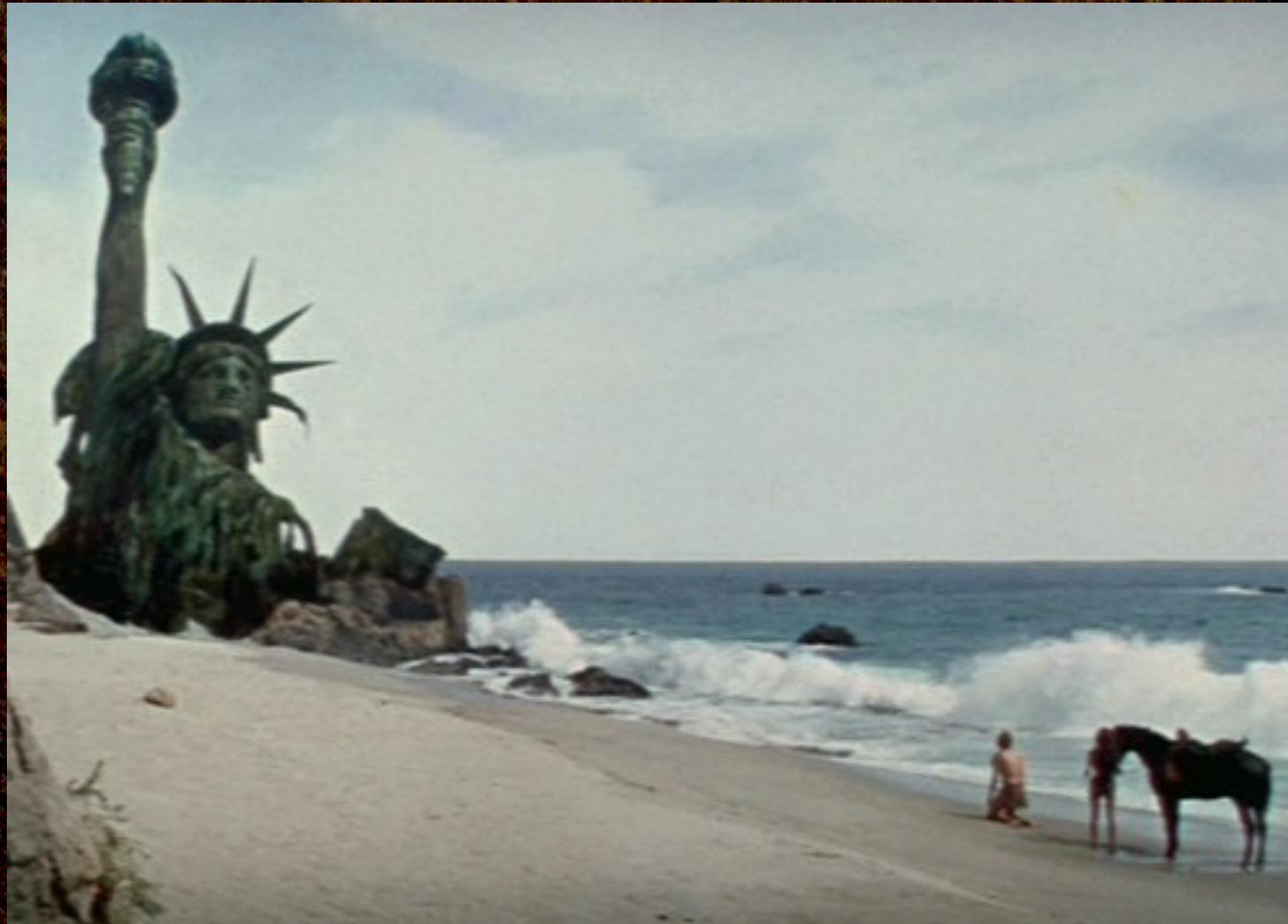
OXFAM

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



**THE
\$26.7 BILLION
OF BONUSES WALL
STREET BANKS PAID
OUT LAST YEAR WOULD
BE ENOUGH TO MORE
THAN DOUBLE THE PAY OF
EVERY ONE OF AMERICA'S
1,085,000 FULL-TIME
MINIMUM WAGE WORKERS.**

Is this the end?



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



A photograph of a sunset over the ocean. The sun is a bright yellow-orange orb on the horizon, casting a shimmering reflection on the water. The sky transitions from a deep blue at the top to a lighter orange near the horizon. The ocean has gentle waves, and the foreground shows a dark, silhouetted beach. A semi-transparent dark blue circle is overlaid on the left side of the image, containing white text.

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

- Pete Seeger, 1919-2014.

Who Are We?

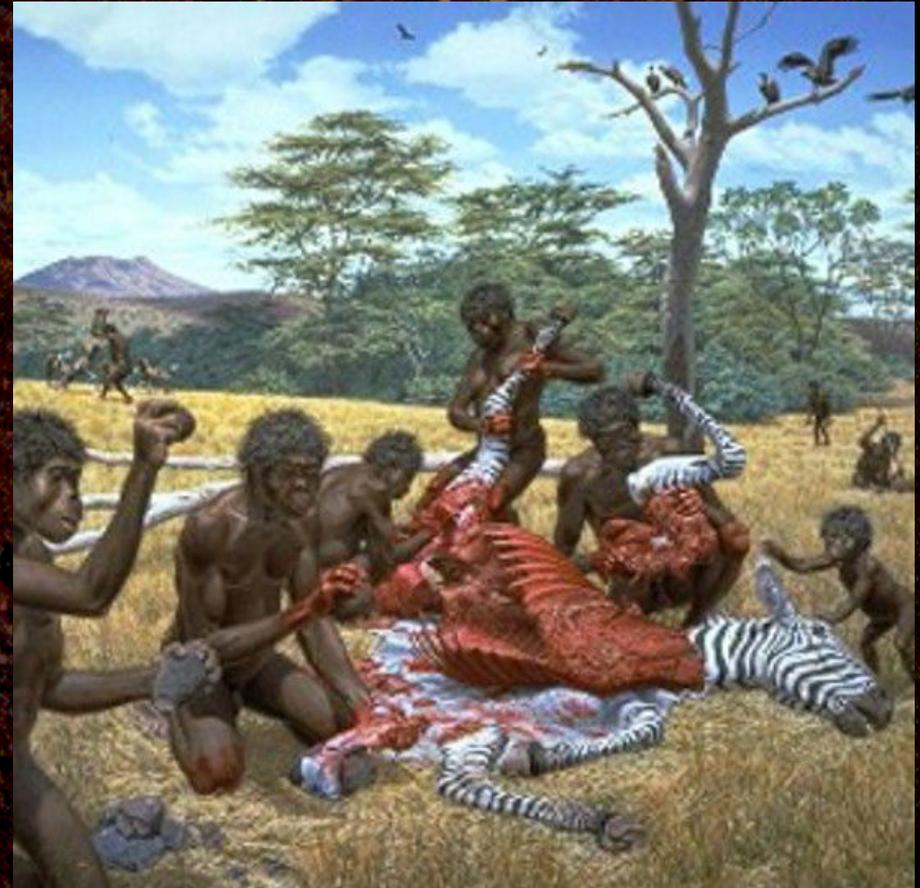
Dr. Paul Lawrence – Four Drivers

Drive to acquire

Drive to defend

Drive to bond

Drive to comprehend

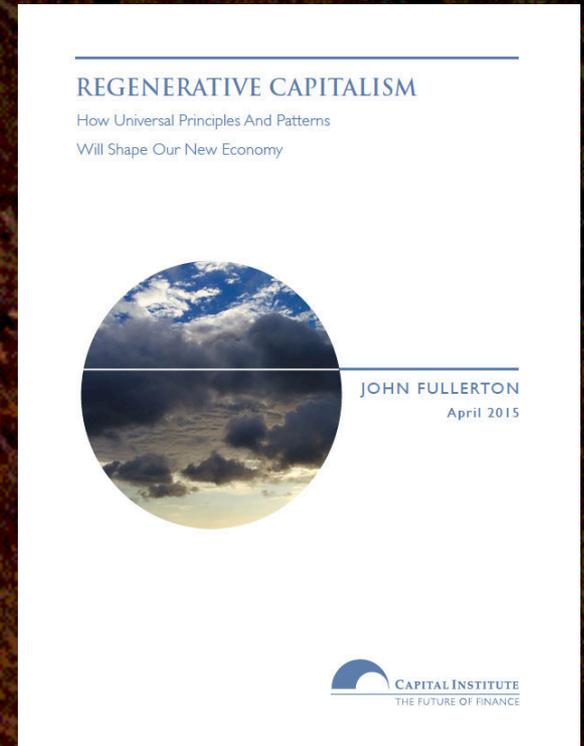


Desired Outcome

Finance

Economy



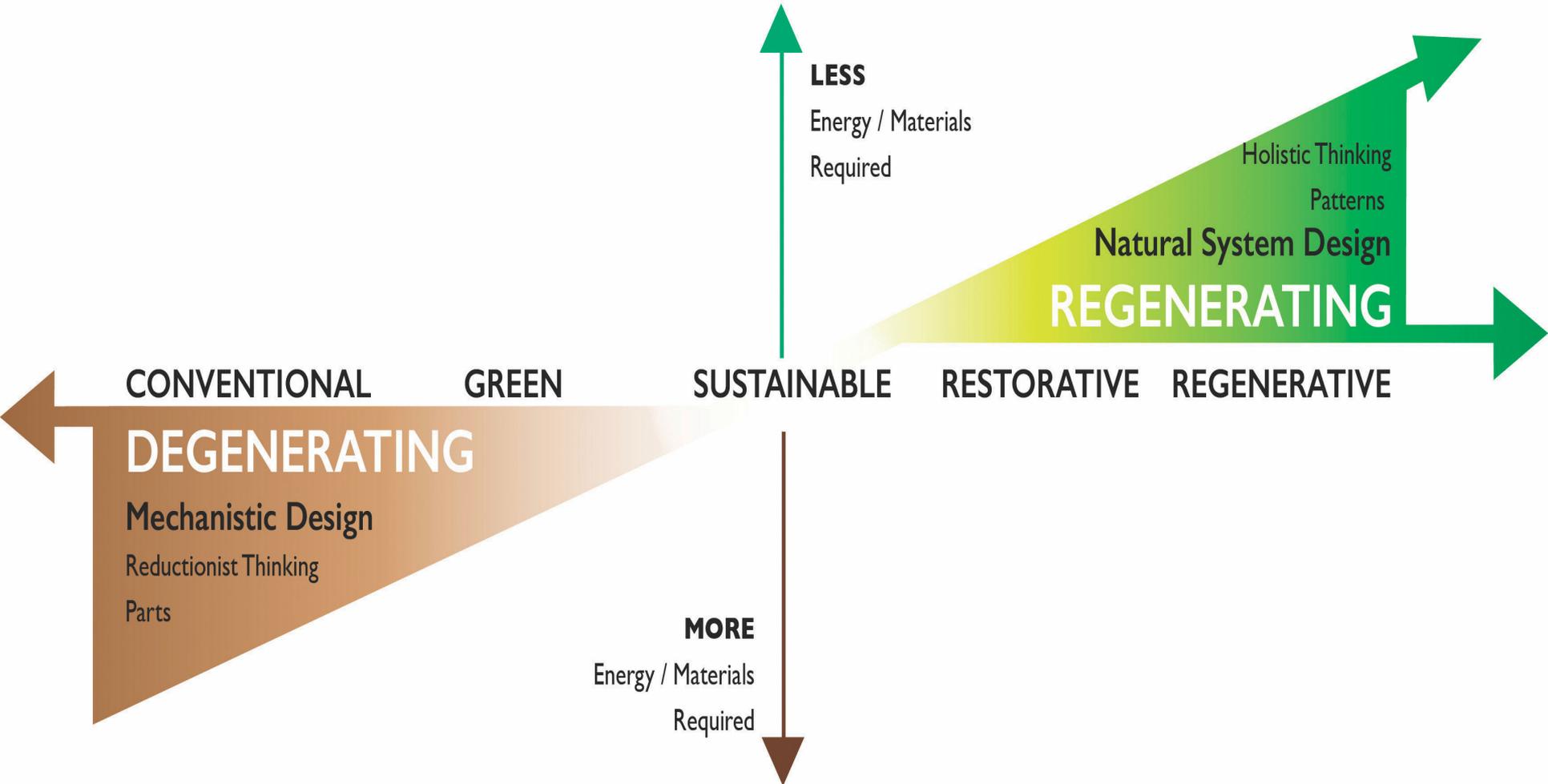


Natural systems are sustainable

because they are Regenerative

AN ECONOMY

Place - Culture - Enterprise - Government - Commons



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



SUSTAINABLE DEVELOPMENT GOALS

1 NO POVERTY



2 ZERO HUNGER



3 GOOD HEALTH AND WELL-BEING



4 QUALITY EDUCATION



5 GENDER EQUALITY



6 CLEAN WATER AND SANITATION



7 AFFORDABLE AND CLEAN ENERGY



8 DECENT WORK AND ECONOMIC GROWTH



9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



10 REDUCED INEQUALITIES



11 SUSTAINABLE CITIES AND COMMUNITIES



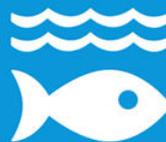
12 RESPONSIBLE CONSUMPTION AND PRODUCTION



13 CLIMATE ACTION



14 LIFE BELOW WATER



15 LIFE ON LAND



16 PEACE, JUSTICE AND STRONG INSTITUTIONS



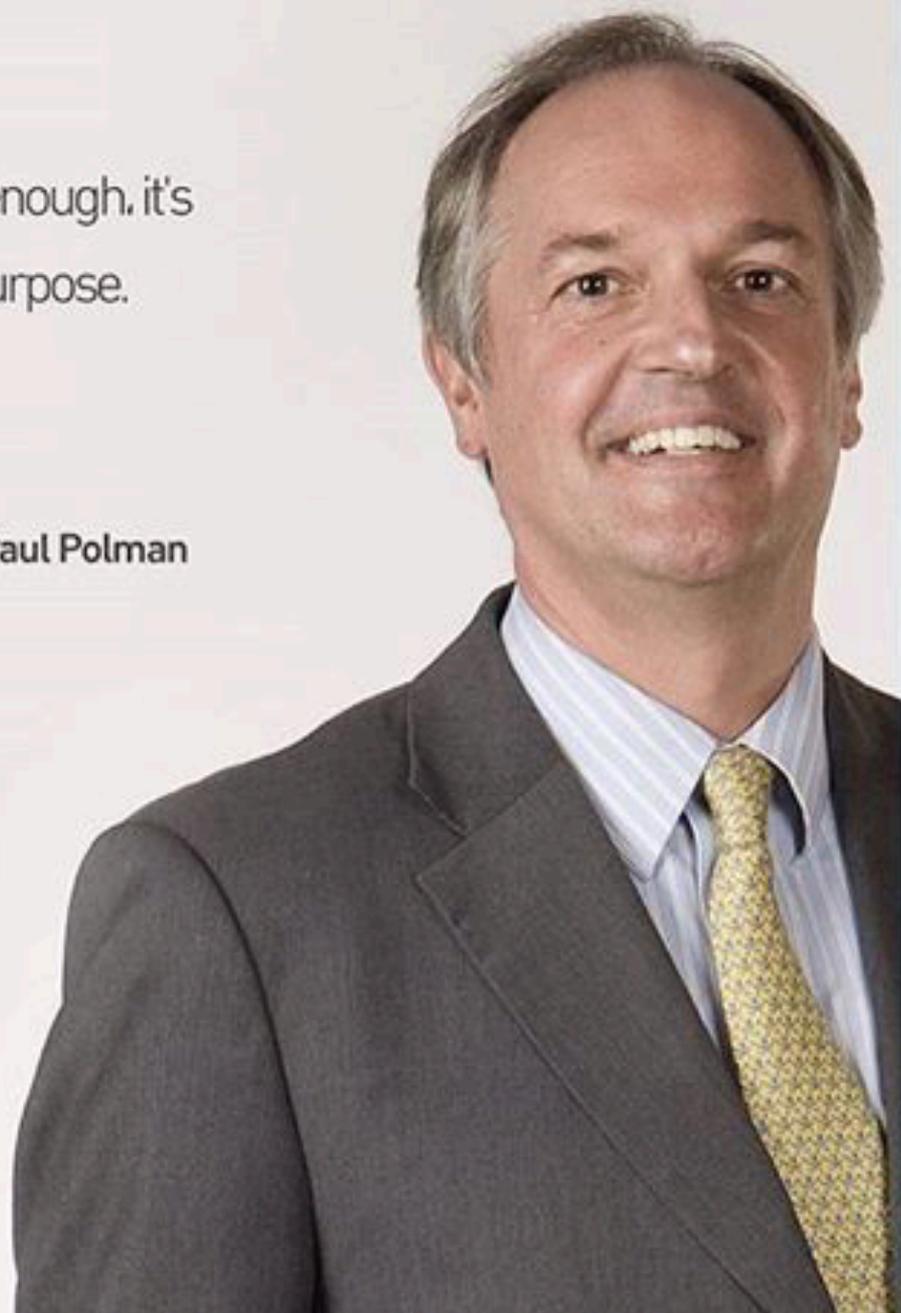
17 PARTNERSHIPS FOR THE GOALS

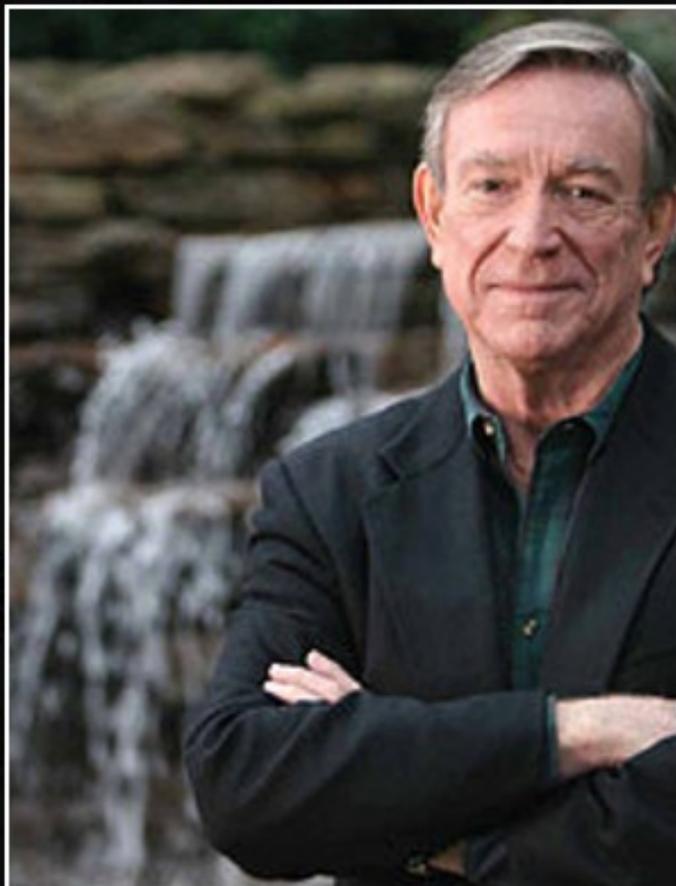


SUSTAINABLE DEVELOPMENT GOALS

Winning alone is not enough, it's
about winning with purpose.

Paul Polman





...there is no more strategic issue for a company, or any organization, than its ultimate purpose. For those who think business exists to make a profit, I suggest they think again. Business makes a profit to exist. Surely it must exist for some higher, nobler purpose than that.

— *Ray Anderson* —

AZ QUOTES

If we insist on ruining the planet,
we have to stop calling ourselves
A superior species



SINCE 2013



30

HUBS ESTABLISHED



6,500,000

HECTARES OF
GRASSLAND INFLUENCED



3,131

LAND MANAGERS
TRAINED

OUR
GOAL



1 BILLION
HECTARES OF LAND AND
100 HUBS



2025

GLOBAL
IMPACT



Climate
Change
Mitigation



Water
Security



Food
Security



Decreased
Poverty

savory.global







Natural Capitalism Solutions
LONGMONT, COLORADO

Email: solutions@natcapsolutions.org

Visit: www.natcapsolutions.org