

# NATURAL CAPITALISM SOLUTIONS



WHAT SUSTAINABILITY NEEDS TO KNOW

# Welcome to the Anthropocene



We are the first generation to have dominion over the earth and likely the last to be able to save it

Dr. Sylvia Earle:

“What we do in the next ten years is more important than what humanity does in the next 10,000 years”



# 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.”

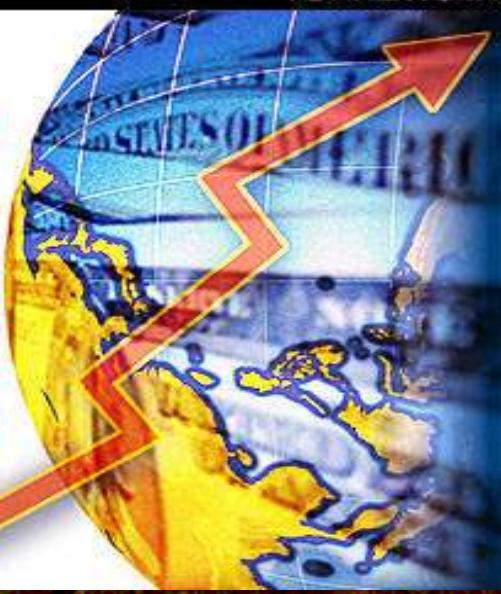
Two crucial features drove collapse:

“...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.”

# ECONOMIC CRISIS:



The HANDY study concluded:

Under conditions "closely reflecting the reality of the world today... we find that **collapse is difficult to avoid.**"

But it observed:

"**Collapse can be avoided** and population can reach equilibrium if the per capita rate of depletion of nature is reduced to a sustainable level, and if resources are distributed in a reasonably equitable fashion."

# The Current Situation

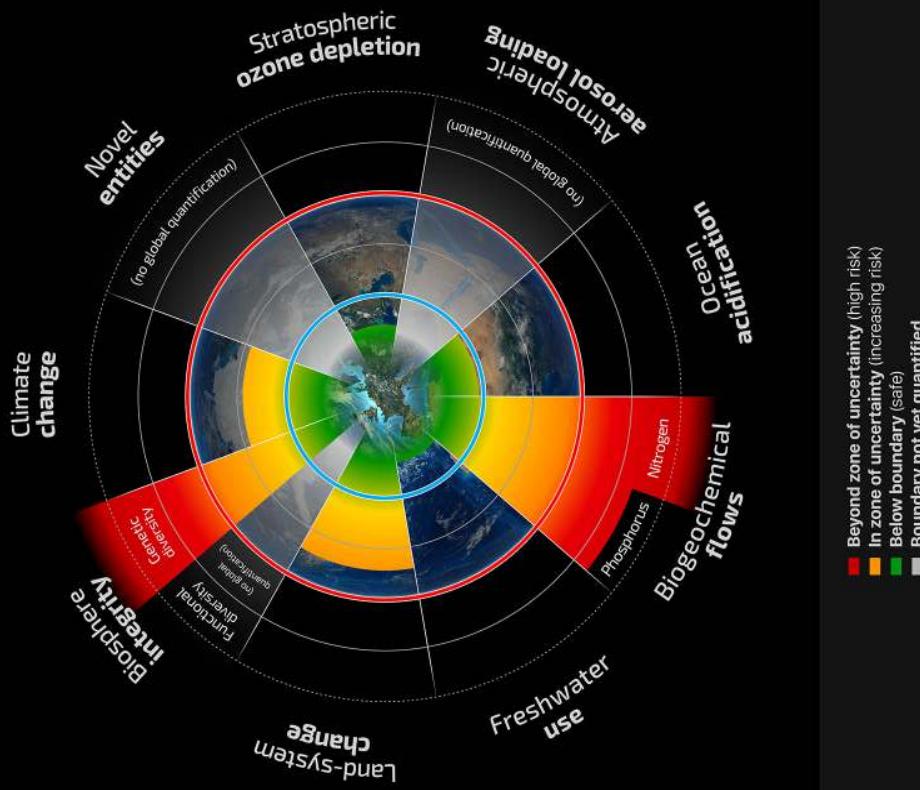
## Planetary Boundaries

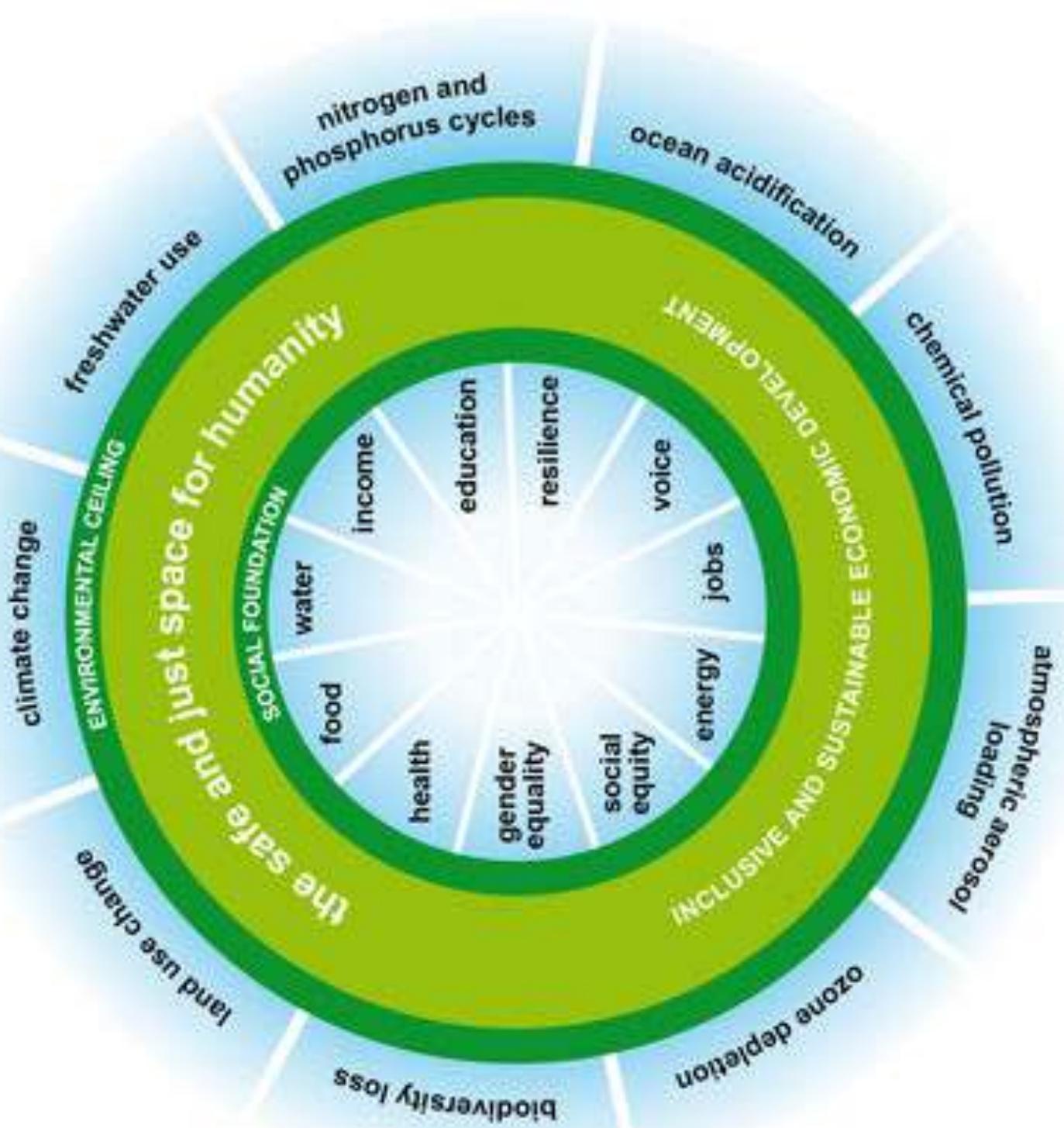
A safe operating space for humanity

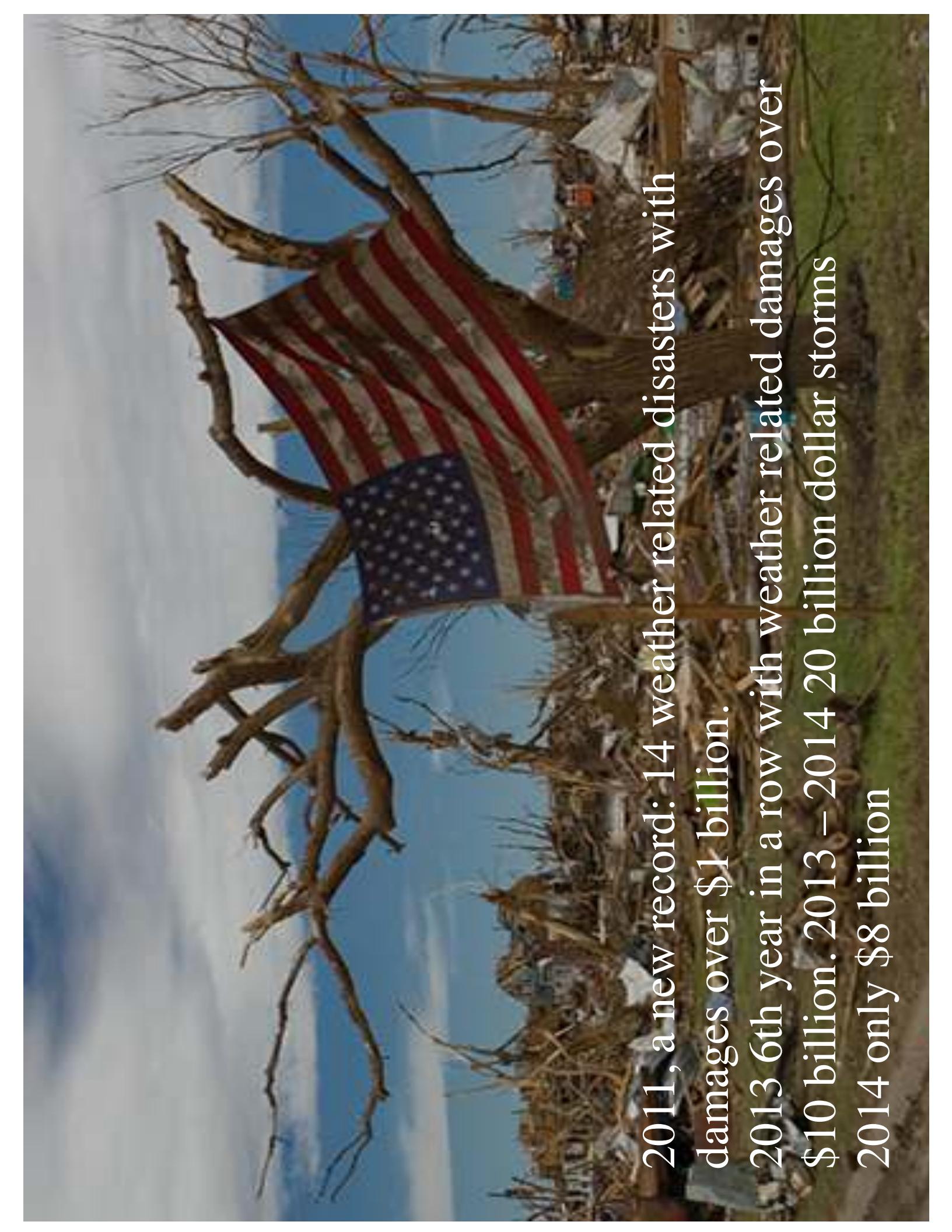
We have exceeded the carrying capacity of the planet.

Fish stocks are depleted.  
100 years of industrial agriculture has consumed and dissipated 50 - 70% of the organic material and natural nutrients that took 10,000 years to accumulate.

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





A photograph showing a large American flag draped over the twisted, fallen trunk of a dead tree. The flag's stars and stripes are clearly visible against a backdrop of a destroyed town with damaged houses and trees under a clear blue sky.

2011, a new record: 14 weather related disasters with damages over \$1 billion.

2013 6th year in a row with weather related damages over \$10 billion. 2013 – 2014 20 billion dollar storms

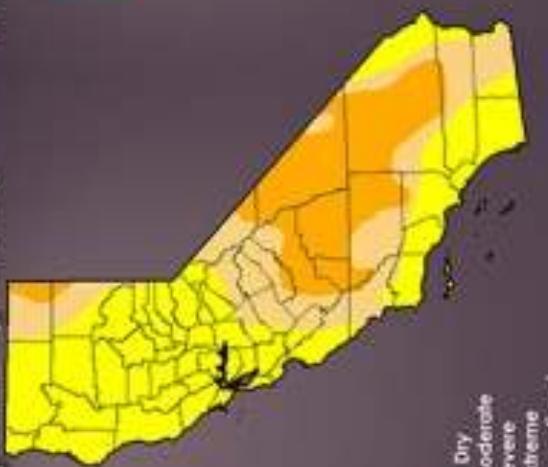
2014 only \$8 billion

Climate change in CA: \$7.4 billion lost

## DROUGHT COMPARISON

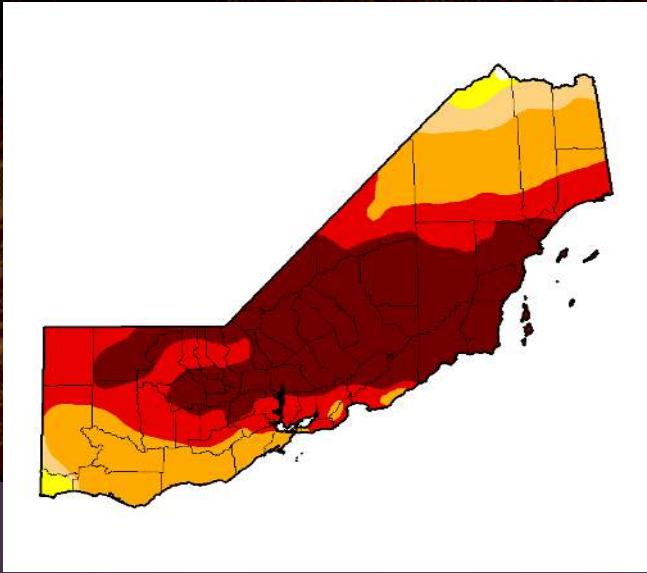
April 2, 2013

April 1, 2014



D0 Abnormally Dry  
D1 Drought - Moderate  
D2 Drought - Severe  
D3 Drought - Extreme  
D4 Drought - Exceptional  
Dataly: NDMC, USDA, and NOAA

CLIMATE CO. CENTRAL



“By the end of the century, the nation's ‘salad bowl' could be a dust bowl. We're looking at a scenario where there's no more agriculture in CA. I don't see how their cities can keep going,”

# California's Drought





400+ dead, almost 3 million cut off, displaced



If climate change continues unabated,  
half the homes in at least 21 US cities  
will be under water by 2100



National Oceanic and  
Atmospheric Administration  
U.S. Department of Commerce

[Search NOAA sites](#)

[NEWS & FEATURES](#)

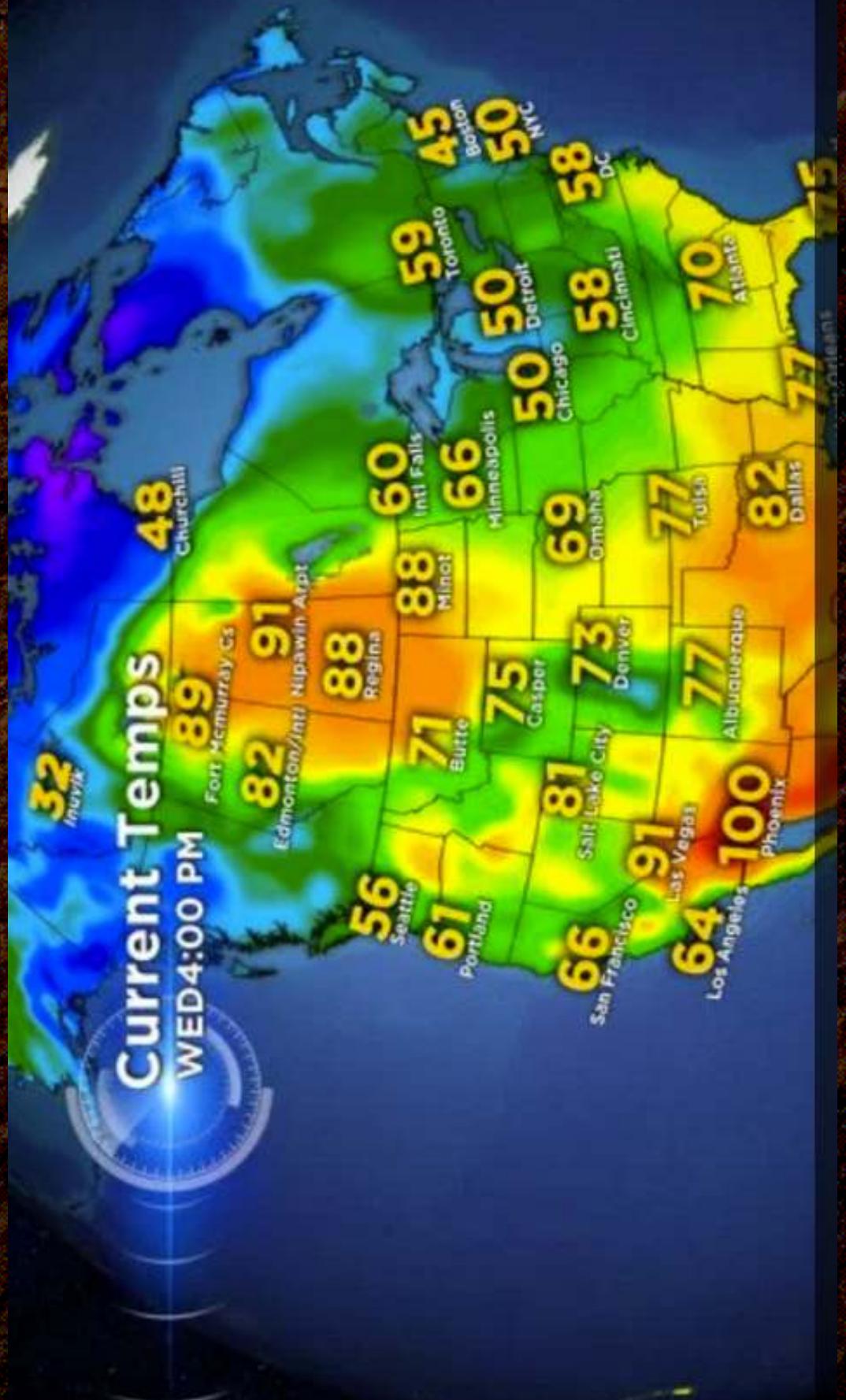
# For 11th straight month, the globe was record warm

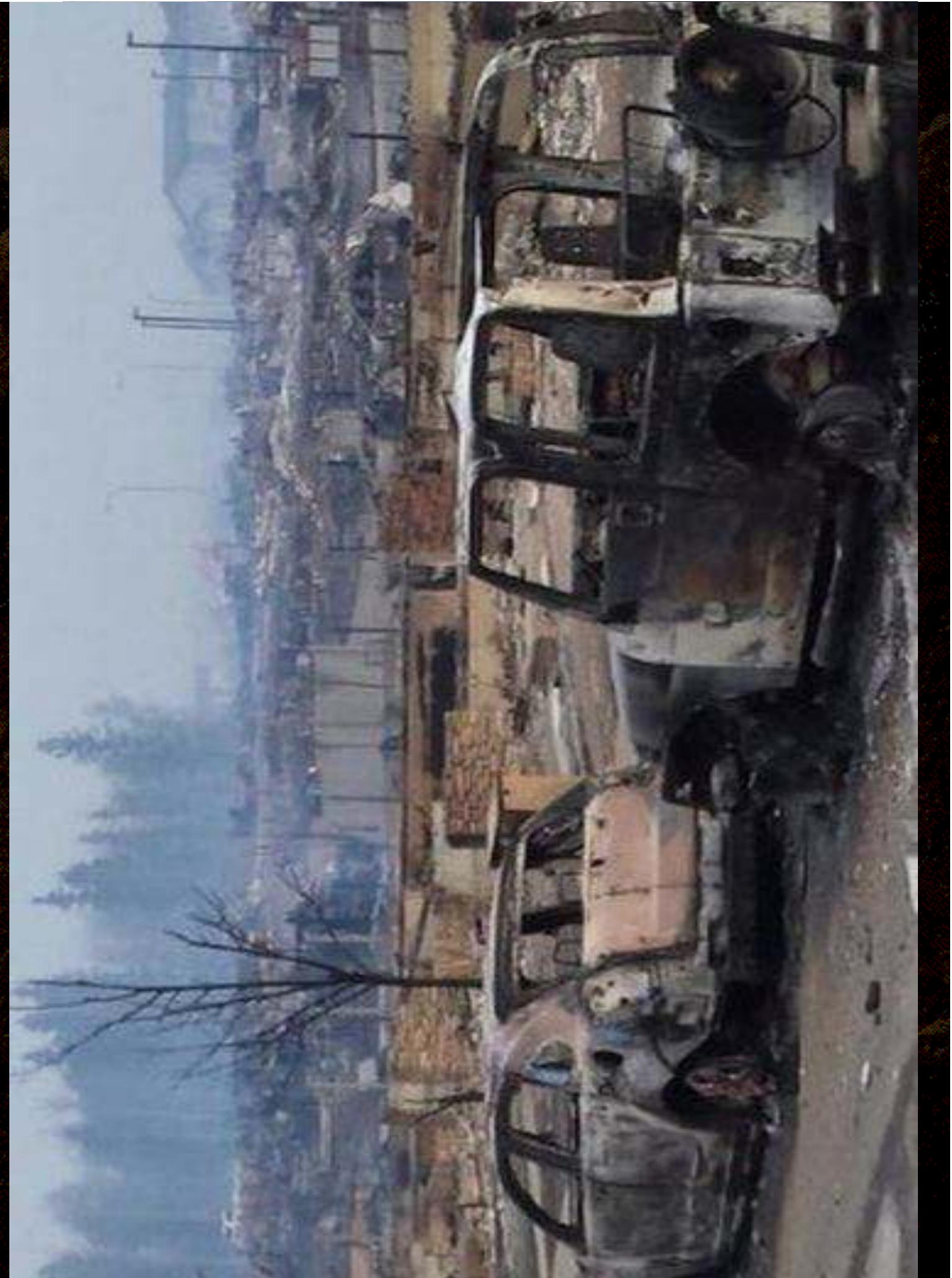
Climate | climate data global average temperatures

SHARE



April 19, 2016 —





# WORLD

TRENDING

[Fort McMurray | Raptors | Liberal Report Card | Bombardier | Bosma | Lotto](#)

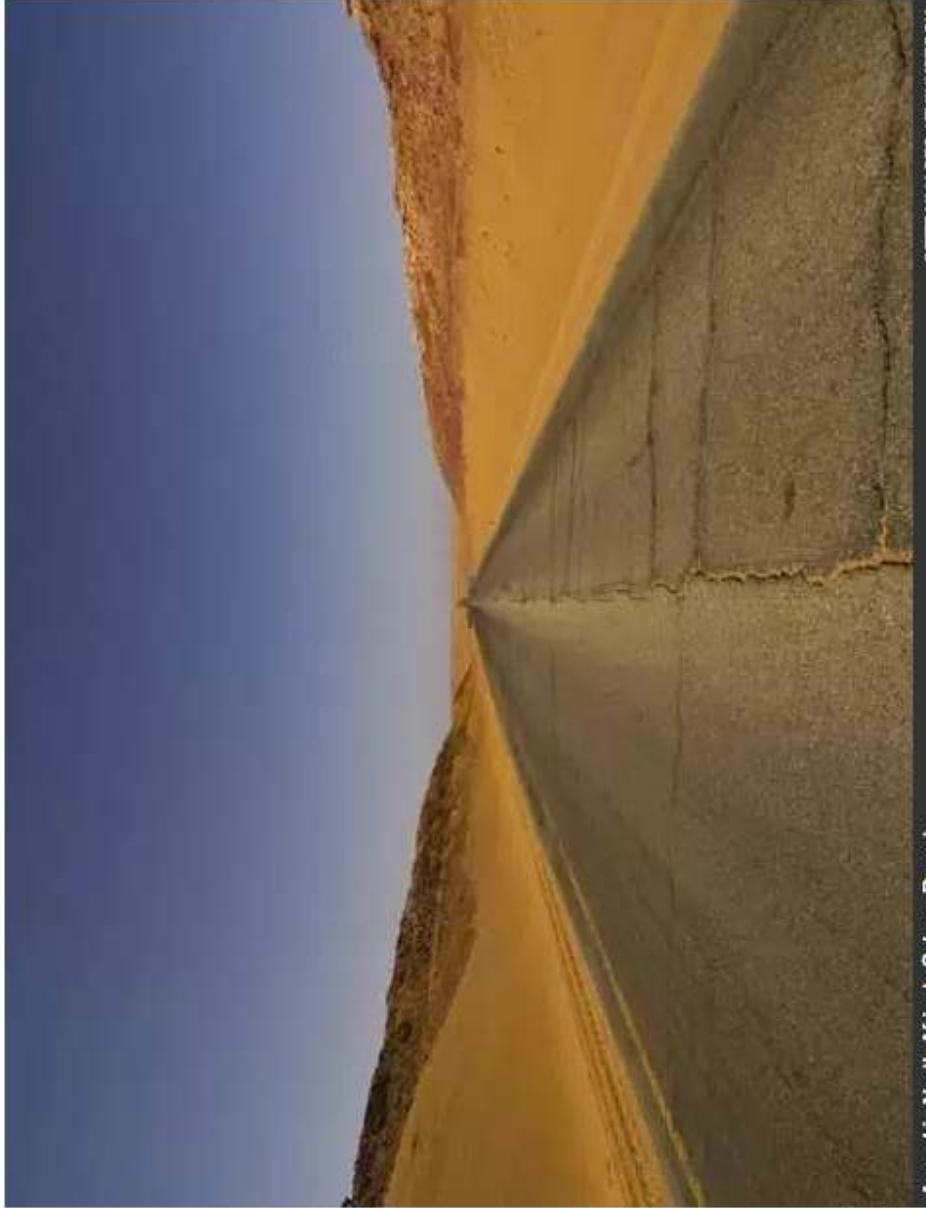
## Swathes of Middle East and North Africa will be too hot for humans as early as the 2040s: study



JAKE EDMISTON | May 3, 2016 4:03 PM ET

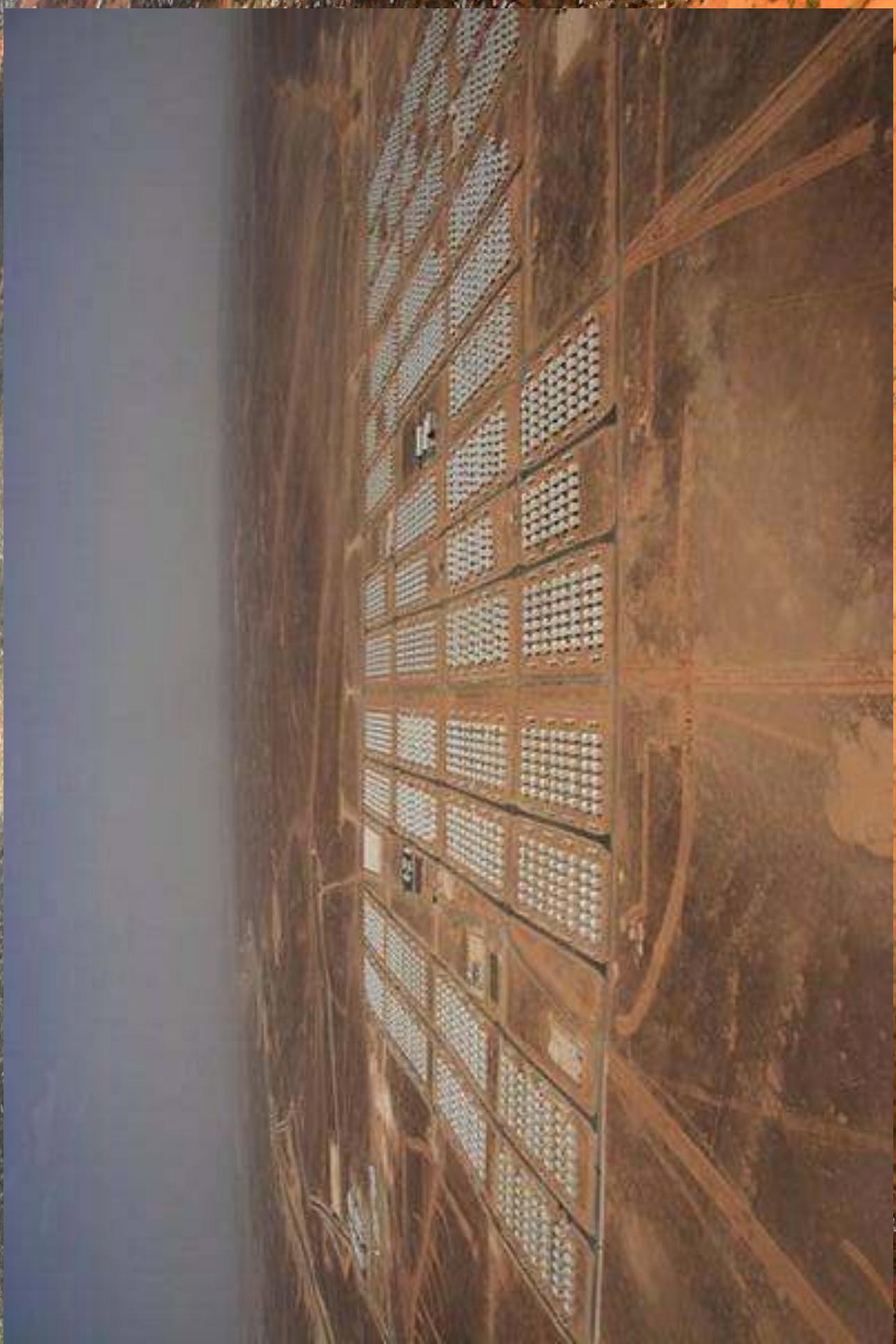
More from Jake Edmiston

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GETTY IMAGES / THINKSTOCK

A road in North Africa's Sahara Desert.





Nature creates conditions  
conducive to life



# The Ultimate Evidence:

## Synthetic Compounds Found In Mother's Milk

<b>HALOGENATED COMPOUNDS</b>	<b>ALDEHYDES</b>	<b>KETONES</b>	<b>OXYGENATED ISOMERS</b>	<b>ALCOHOLS</b>	<b>ACIDS</b>
chlorodifluoromethane	acetaldehyde	acetone	C4H6O	methanol	acetic acid
chlorotrifluoromethane	methyl propanal	methyl ethyl ketone	C4H8O	isopropanol	decanonic acid
dichlorofluoromethane	n-butanal	methyl propyl ketone	C5H10O	n-propanol	
chloromethane	crotoaldehyde	methyl vinyl ketone	C4H6O <sub>2</sub>	1-butanol	
trichlorofluoromethane	n-penanal	ethyl vinyl ketone	C7H10O	1-pentanol	
dichloroethylene	n-hexanal	2-pentanone	C7H14O <sub>2</sub>	x-furfuryl alcohol	
Freon 113	furaldehyde	methyl pentanone	C6H6O <sub>2</sub>	2-ethyl-1-hexanol	
methylene chloride	n-heptanal	methyl hydrofuranone	C6H16O	phenol	
chloroform	benzaldehyde	2-methyl-3-hexanone	C7H8O <sub>2</sub>	2,2,4-trimethylpentane	
1,1,1 – trichloroethane	n-octanal	4-heptaonone	C9H18O	1,3-diol	
carbon tetrachloride	phenyl acetaldehyde	3-heptaonone	C8H6O <sub>2</sub>	x-terpineol	
trichloroethylene	n-nonanal	2-heptaonone	C10H12O <sub>2</sub>		
chloropentane	methyl furaldehyde	methyl heptaonone	C10H14O		
chlorobenzene	n-decanal	furyl methyl ketone	C10H16O		
iodopentane	n-undecanal	octanone	C10H18O		
3-methyl-1-iodobutane	n-dodecanal	acetophenone	CH10H20O		
chloroethylbenzene		2-nonanone	C10H22O		
dibromodichloromethane		2-decanone	C9H8O		
dichlorobenzene		alkylated lactone			
trichlorobenzene		phthalide			

# Nature as mentor

Design that adopts the experience of life, refined by 3.8 billion years of rigorous testing.

All products that didn't work were recalled by the Manufacturer.



# New Rule

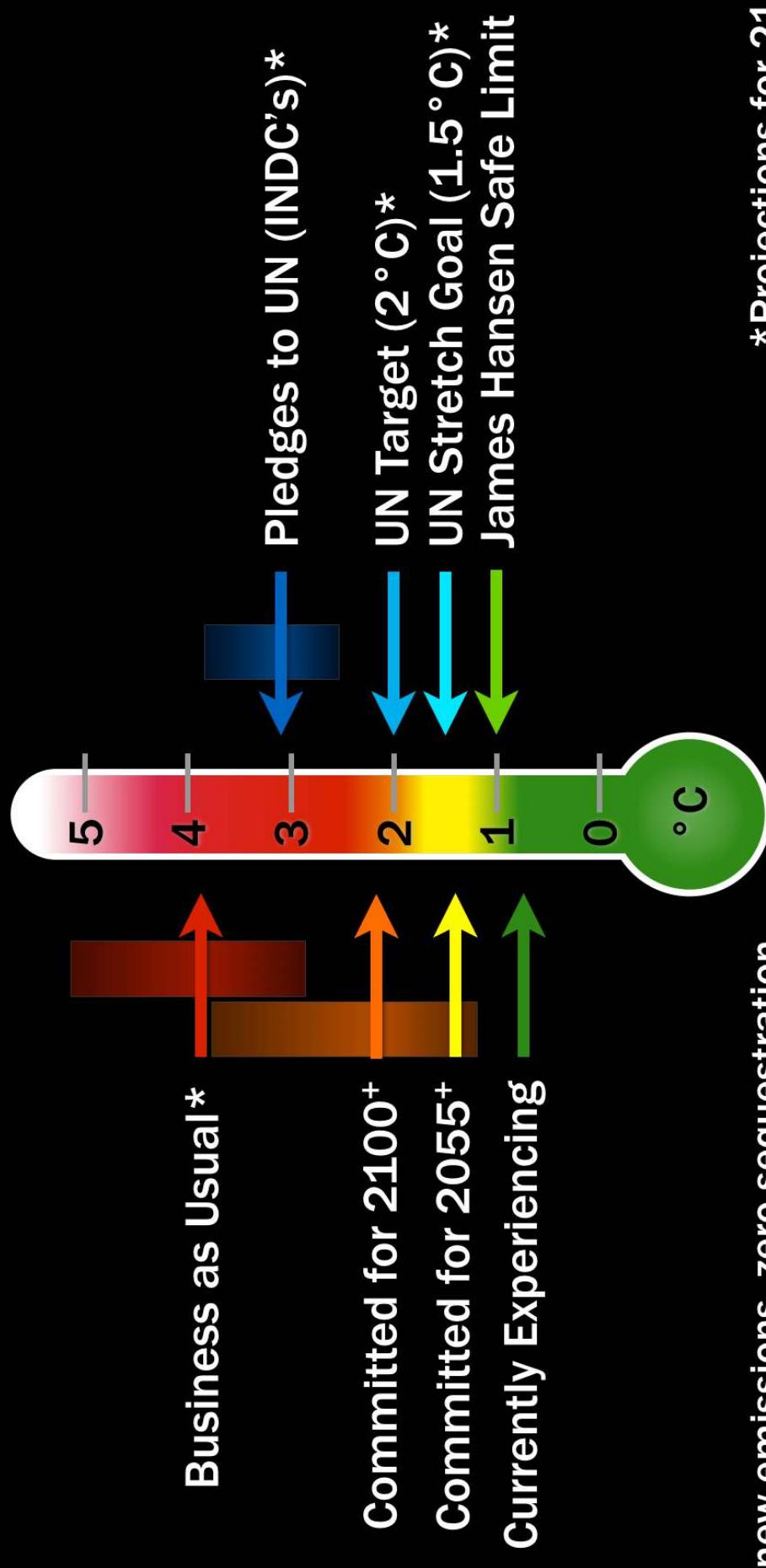
If we insist on ruining the planet,  
we have to stop claiming we're a  
“superior species.”



Presidential Climate Action Project

# CLIMATE CHANGE NUMBERS FOR COP21 IN PARIS

*Temperature Increases Above Pre-Industrial Levels*



+Zero new emissions, zero sequestration

\*NOTE: Pledges, BAU Scenario, and temperature colors from ©Ecofys and Climate Analytics, <http://climateactiontracker.org/>, other credits at [markatcop21.wordpress.com](http://markatcop21.wordpress.com)

\*Projections for 2100

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

# A green school is not tokenism

It is what is taught in  
the building

It is the building itself

It is the connection to  
the community

It is service to a world  
in crisis

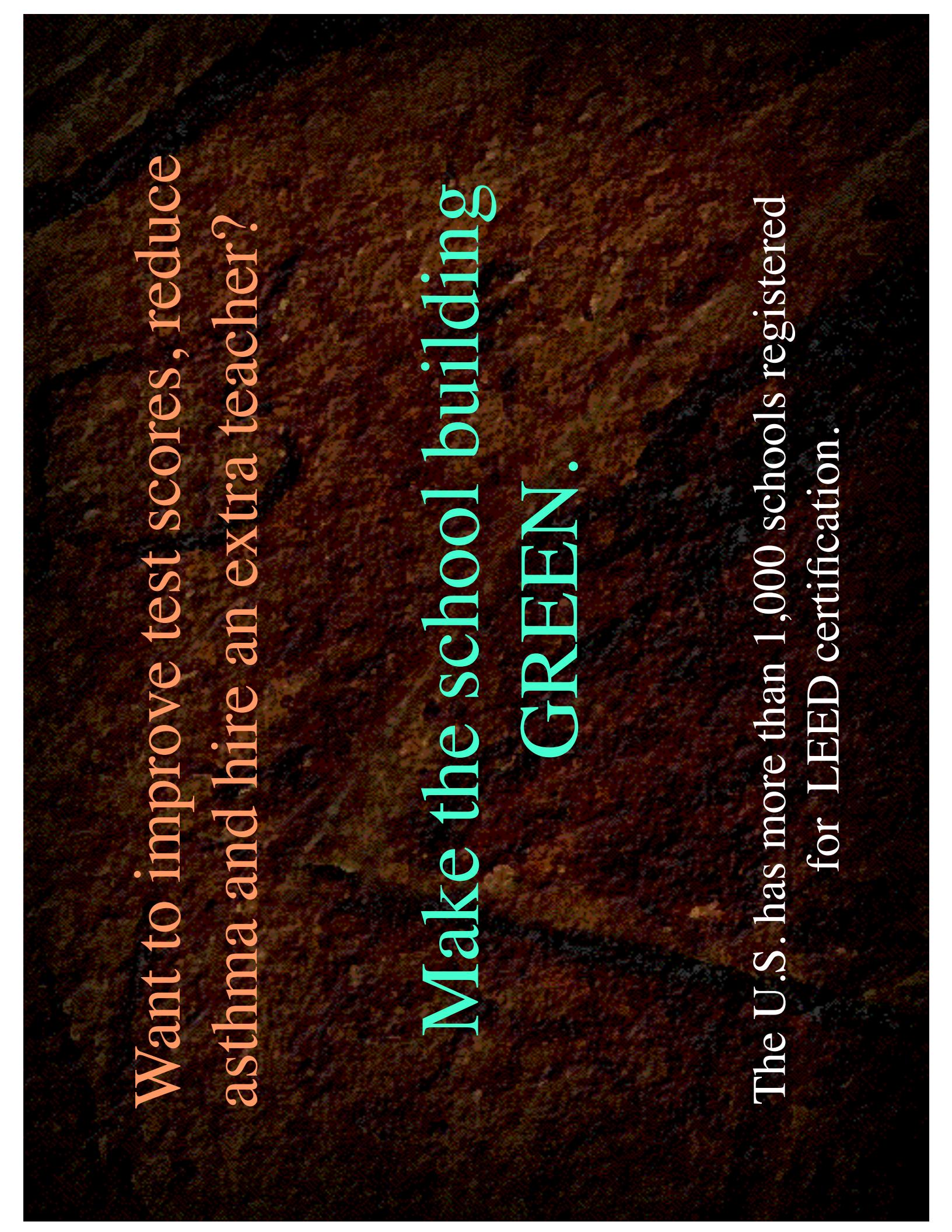


# Ohio State University

Turning off computers at night, saved the University over \$250,000 a year.



This money is used for academic programs across the campus



Want to improve test scores, reduce  
asthma and hire an extra teacher?

Make the school building  
**GREEN.**

The U.S. has more than 1,000 schools registered  
for LEED certification.

# Case Study: Daylighting, Fair Oaks CA

A study of more than 21,000 students, showed dramatic correlation between daylit school environments and student performance:

20% faster progression  
in math and

26% faster progression  
in reading



# Green buildings improve labor productivity and worker health

Improving indoor air quality could save U.S. businesses \$200 billion earned in increased worker performance

Another \$58 billion in avoided sick time each year



# The top green building since 1980 – Oberlin College

PV roof produces 45 KW  
grid- integrated power

Recycled materials and FSC  
certified wood.

Passive solar heat/  
ventilation / daylighting  
geothermal HVAC

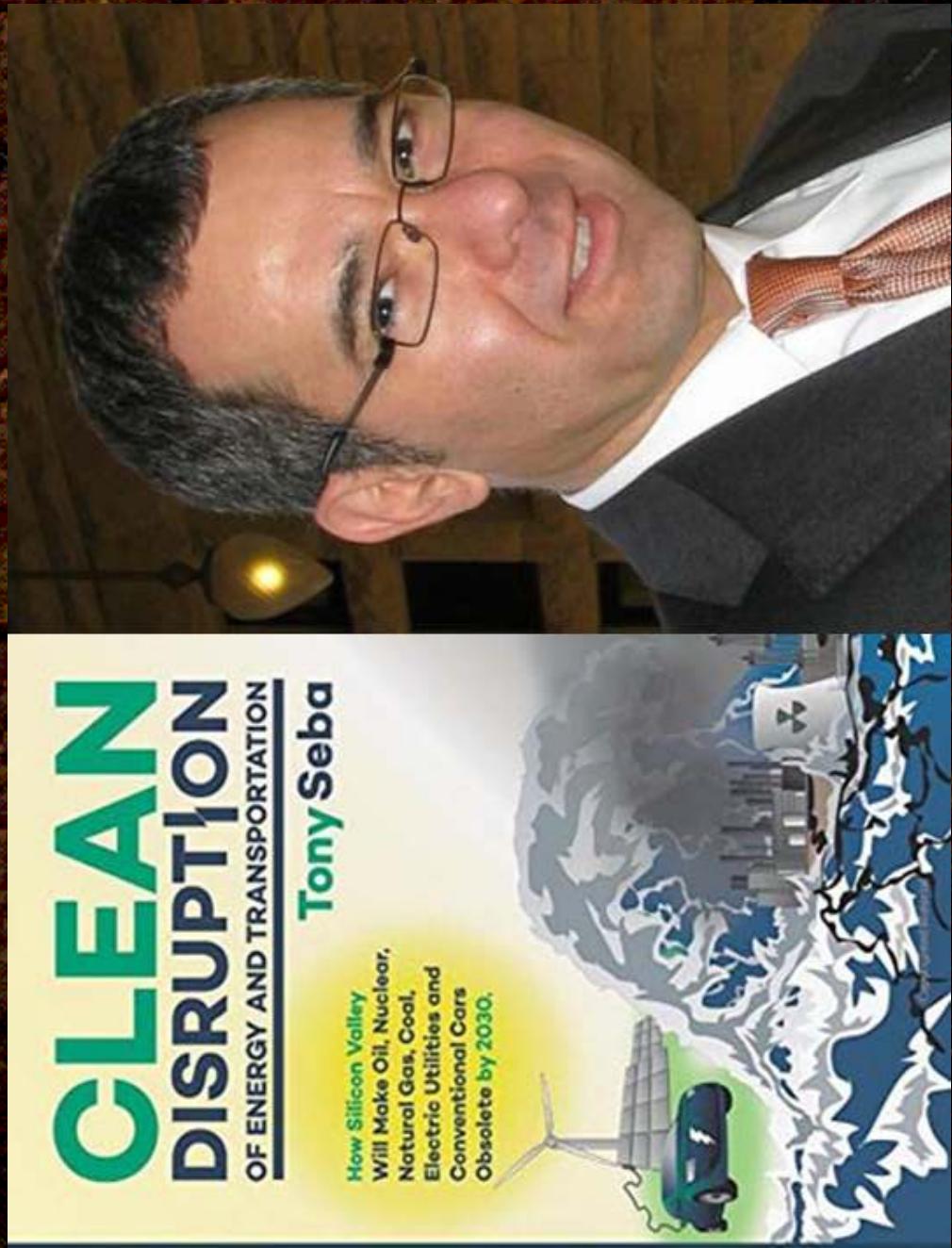
Edible landscaping



Adam Lewis Center for  
Environmental Science

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](http://www.tonyseba.com)

# 2015 – Clean Disruption of Energy & Transportation

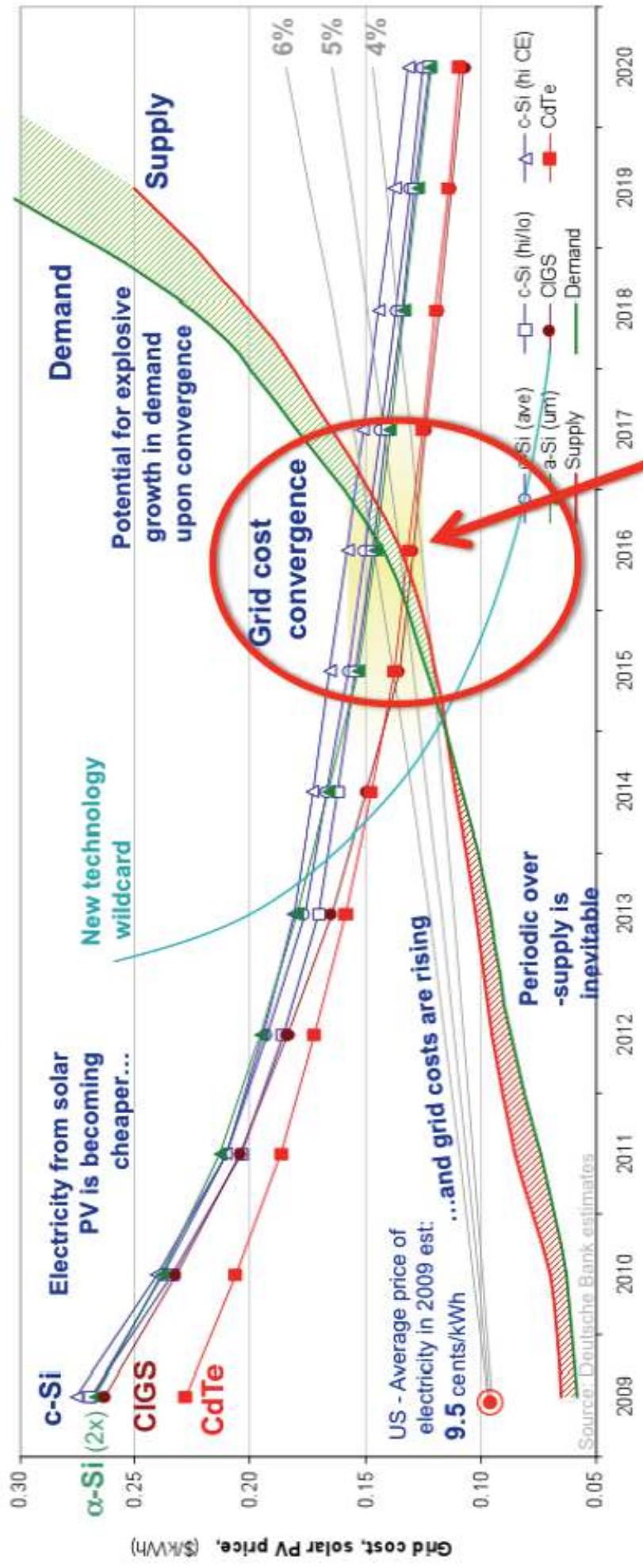
- The technologies, skills, organizations, and culture of the industrial revolution have run out of steam
- They are being replaced by the technologies, skills, organizations, and culture of the "Silicon Valley" technology revolution



- 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

# Grid Parity in 80% Global Markets by 2017



- Solar already below grid parity in hundreds of markets globally.
- *Deutsche Bank: Solar Below Grid Parity in ALL 50 states in the USA by 2016 and Up to 80% of Global markets by 2017*

**“With no technological breakthroughs cost reduction will continue, with costs of 4-6 c/kWh expected by 2025, and 2-4 c/kWh by 2050.”**

## Financing the Future of Energy

The opportunity for the Gulf's financial services sector

A report for the National Bank of Abu Dhabi by the University of Cambridge and PwC

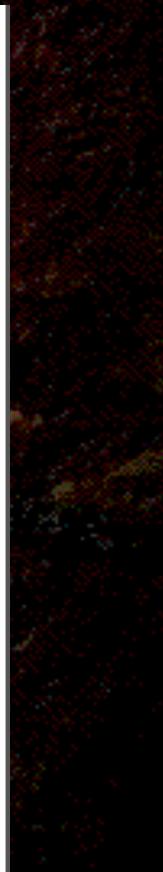
March 2015

Change is happening fast. In 2014, CA increased utility-scale solar from 1.9% of its electricity to 5%.

**“Most scenarios underestimate the role of solar power in future energy systems.”**



Produced for

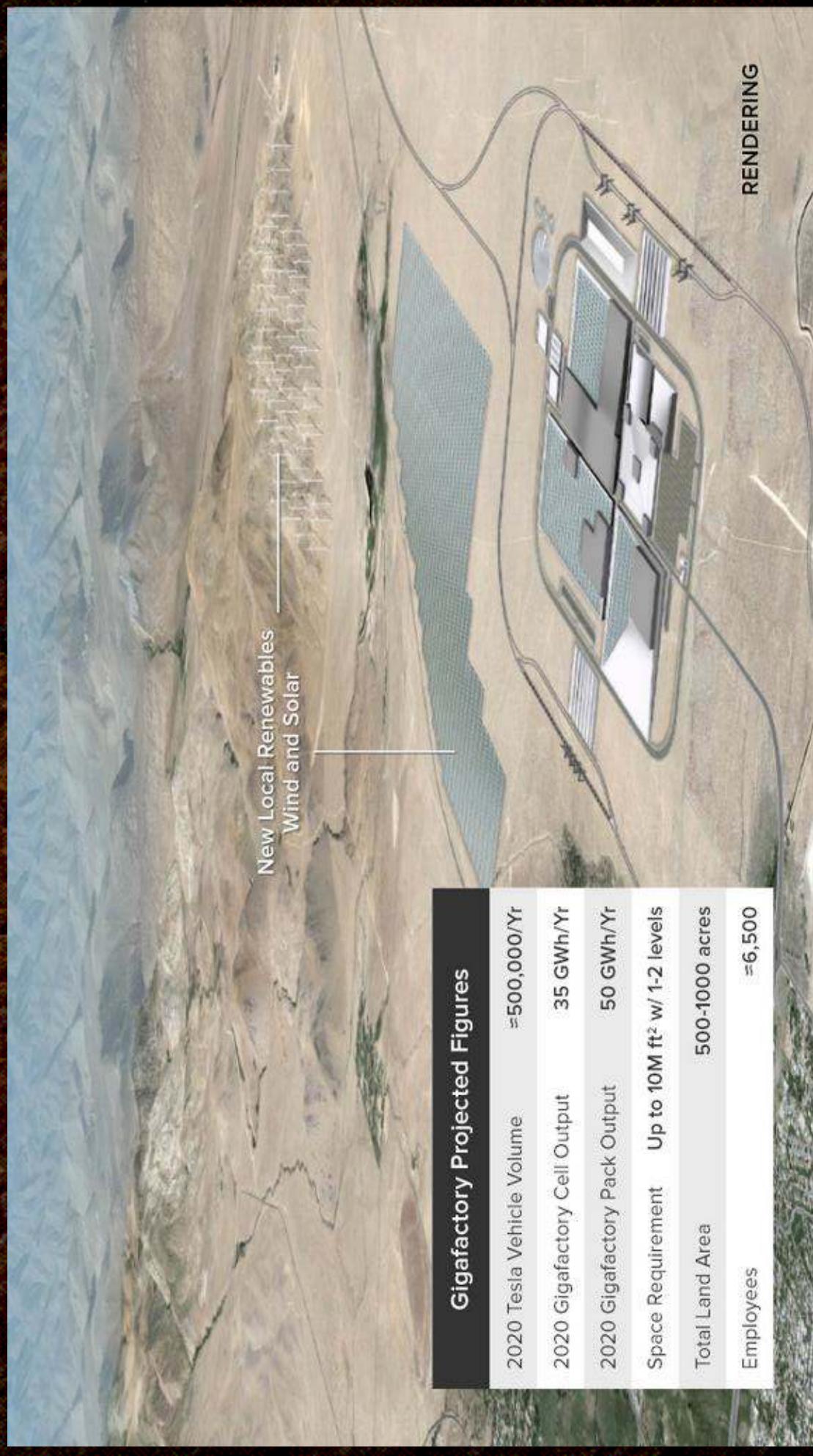


# How the world has changed

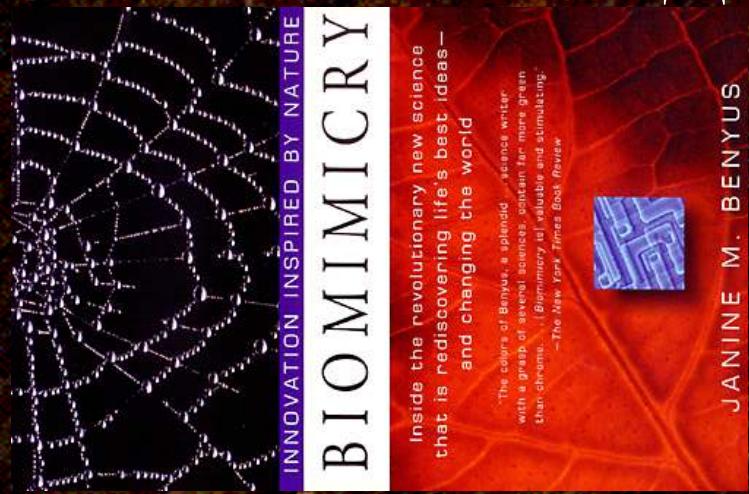
Tesla is valued at more than half of GM – despite producing 300 times fewer cars



# It's a battery company



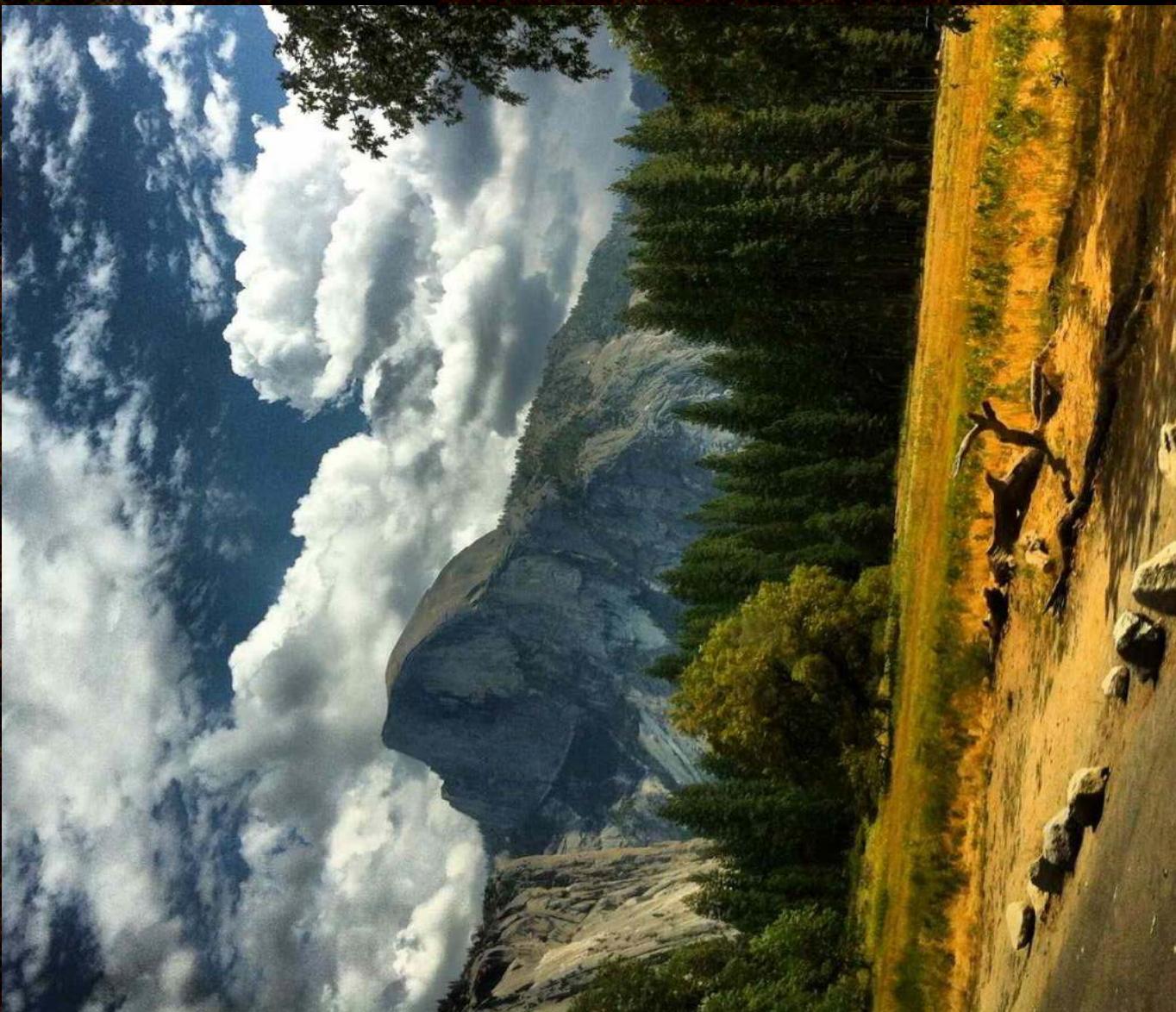
# How does nature do business?



Nature uses:

- Sunlight
- Low energy flows
- No persistent toxics
- Near Body manufacturing
- Ambient temperature manufacturing
- Closed loops: everything is recycled
- Nature shops locally





Biologists tell us that edges of ecosystems are where the greatest abundance lives.

Where two ecosystem converge is where the diversity and fertility is found in nature - as where a meadow meets the forest or a river enters the ocean – Because there is diversity

Entrepreneurs have always sailed over the edge of the linear economy to find new lands, new hope, to counter such flat earth nonsense as climate denial.

There IS a round economy out there - a circular economy, a sharing economy - to counter the liquidation economy now ravaging the planet.



To keep warming below 2 degrees C, emissions reduction is necessary, 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

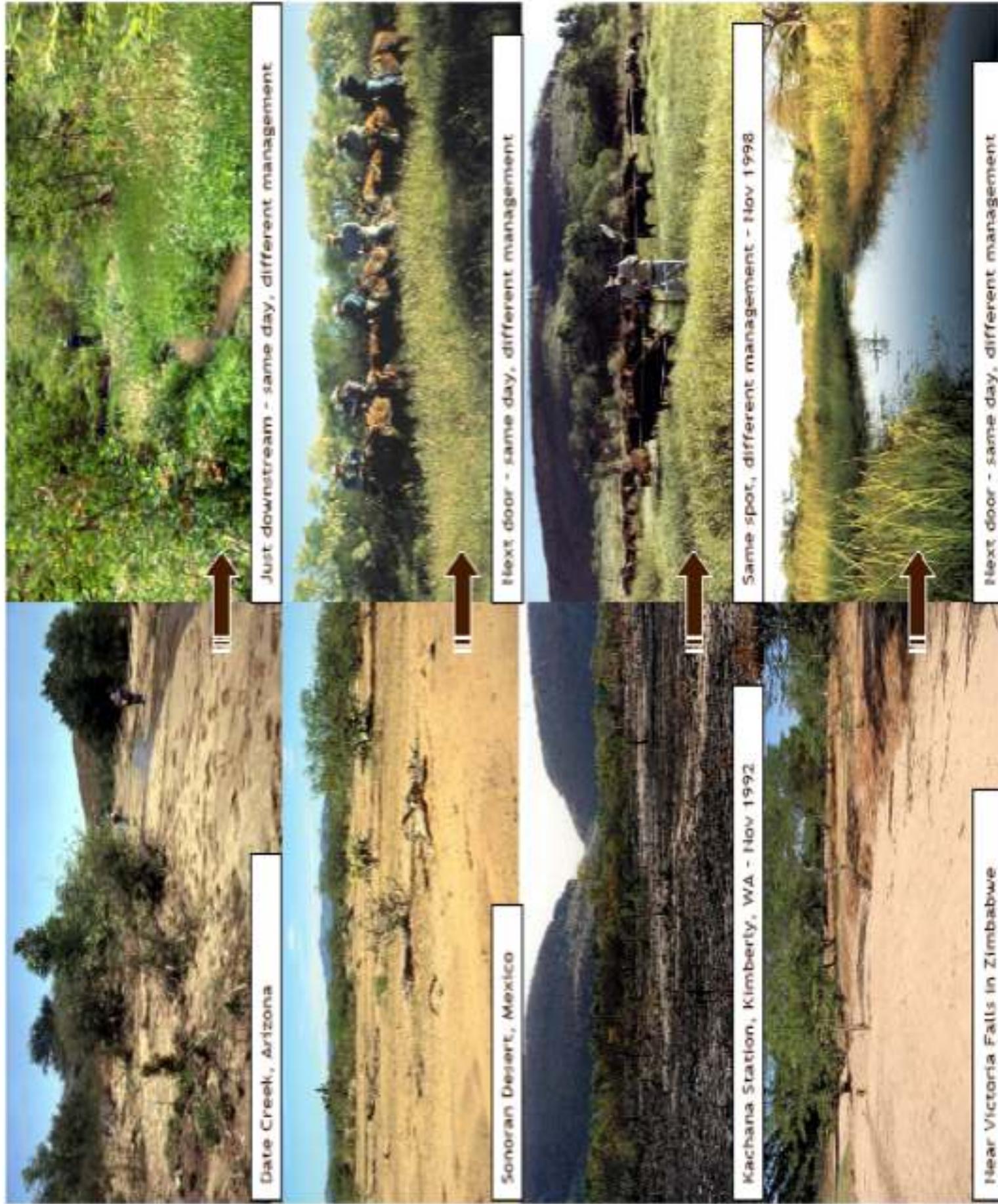
nutiva®

# 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.





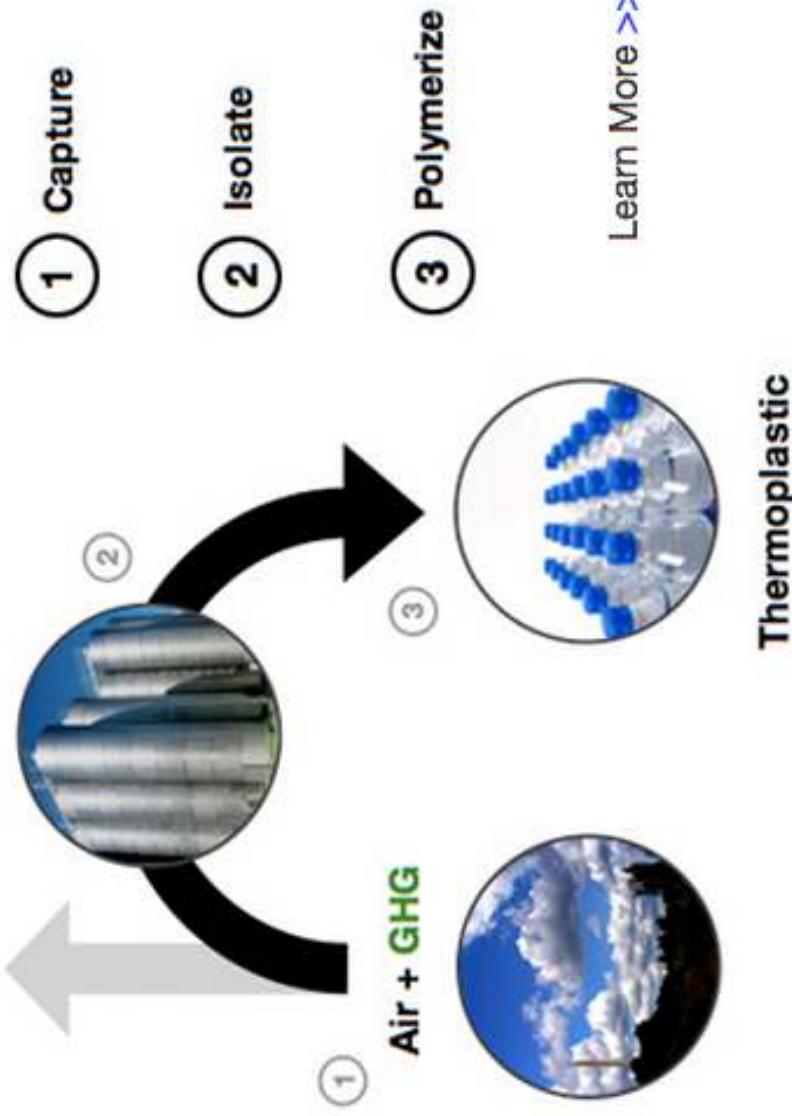
In nature carbon is not the  
world's greatest poison



Plastic substitute from  
CO<sub>2</sub> - combines air with  
methane-based  
greenhouse gas emissions  
to produce a plastic  
material called  
AirCarbon™



Air + Greenhouse Gas → Thermoplastic



Working with 60 Fortune  
500 companies supplying  
cell phone cases, chairs,  
plastic bags, etc.

2015 signed 20 yr  
contract to supply 19  
billion lbs

[Learn More >>](#)

COURTESY ASTUDIO



Synthetic biology could create buildings that inhale carbon dioxide, and control temperature without air conditioning –

Dr Rachel Armstrong, senior TED Fellow, Director of Avatar

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

William Gibson

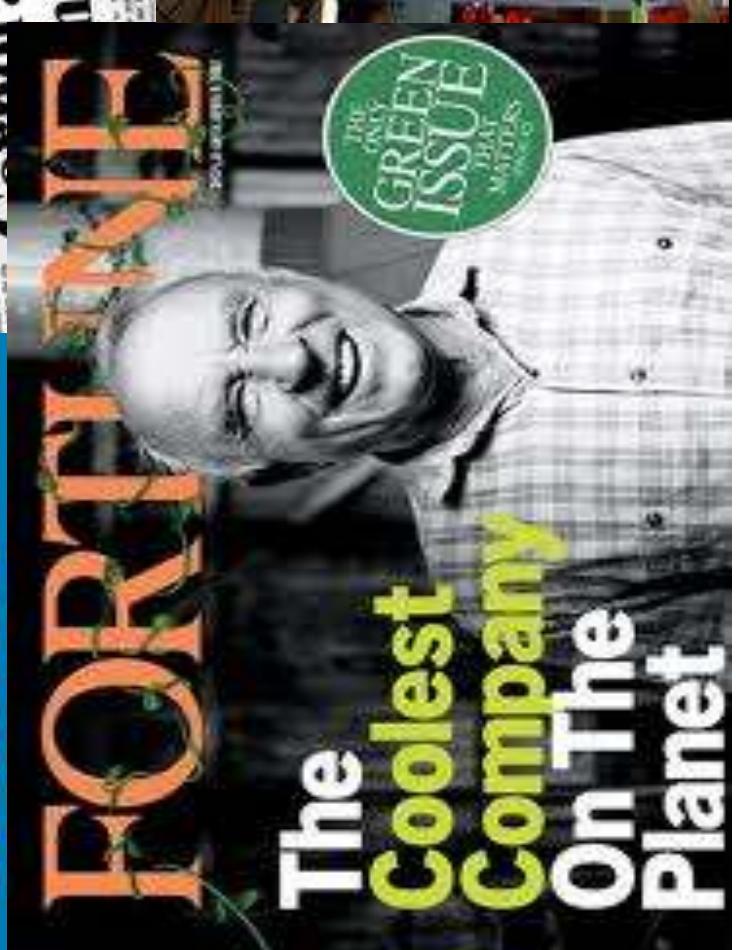
We have all the technologies we need  
to solve **all** the challenges facing humanity



THE STAIN-SUSABILITY  
EDGE



Sustainability is happening



# Refusal to report quarterly

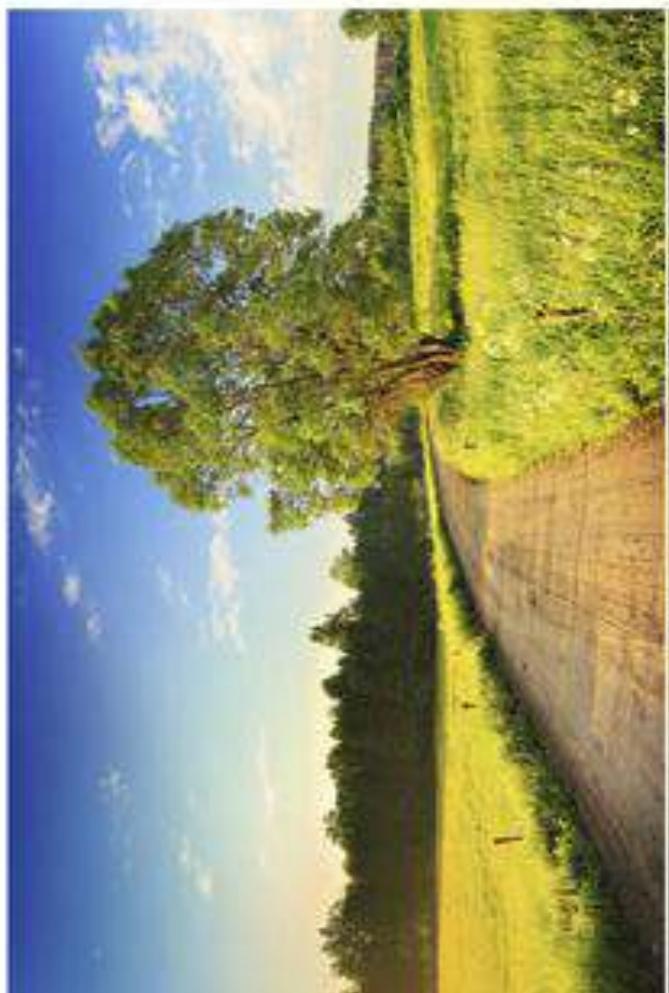
The ultimate cost of short-termism was the **financial crisis of 2008-9.** 'Too many investors have become short-term gamblers: the more fluctuations in share price they can engineer, the better it is for them. It is not good for the companies or for society, but it is influencing the way firms are being run, all the same.... To drag the world back to sanity, we need to know why we are here. The answer is: for consumers, not shareholders. If we are in sync with consumer needs and the environment in which we operate, and take responsibility for society as well as for our employees, then the shareholder will also be rewarded'



**Paul Polman**

The strategy should be based on a new narrative of the economy and the purpose of the economy and the corporation, a new conceptualization of wealth and progress, and of the future we want to see and a new purpose of humanity. It should speak to hearts as well as minds and inspire action and bring hope by communicating positive stories of change.

Bjorn Haugland  
Chief Sustainability Officer  
DNV-GL



A BROADER VIEW

A SAFE AND  
SUSTAINABLE  
FUTURE:  
ENABLING THE  
TRANSITION

SAFER. SMARTER. GREENER.

# SUSTAINABILITY PAYS

Studies That Prove the Business Case for Sustainability



# 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...

Desired Outcome

Finance  
Economy

Planet



## Old Mindset:

Linear  
Earth made for humans  
Violent (brute force)  
Control nature  
Short time frames  
Earth is a limitless source  
and sink for waste  
Technology is omnipotent  
Doing well  
Extractive processes  
Waste as waste  
Externalize externalities  
Benefits for a few  
Creates waste

## New Mindset:

Cyclical, Systemic  
Humans made for Earth  
Caring and restoring  
Emulate nature, work with  
Longer time frames  
Earth is finite source & sink  
Technology as solution  
Doing well by doing good  
Renewable processes  
Waste as resources  
Internalize externalities  
Benefits all  
Creates value

THE HUFFINGTON POST

**BREAKING NEWS**

Saturday December 12, 2015

# Historic Climate Change Agreement Adopted In Paris



François Mori/AP





# SUSTAINABLE DEVELOPMENT GOALS



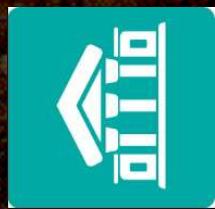
# Principles for Responsible Management Education (PRME)

- Global Compact's initiative to transform management education, research and thought leadership globally, based on the Principles for Responsible Management Education and the United Nations' Sustainable Development Goals
- Launched in 2007



# The six PRME Principles UN supported engagement framework for higher education.

*As institutions of higher education involved in the development of current and future managers we declare our willingness to progress in the implementation, within our institution, of the following Principles...*



# The Six PRME Principles

---

**Principle 1 - Purpose:** We will develop the capabilities of students to be future generators of sustainable value for business and society at large and to work for an inclusive and sustainable global economy.



**Principle 2 - Values:** We will incorporate into our academic activities and curricula the values of global social responsibility as portrayed in international initiatives such as the United Nations Global Compact.



**Principle 3 - Method:** We will create educational frameworks, materials, processes and environments that enable effective learning experiences for responsible leadership.



**Principle 4 - Research:** We will engage in **conceptual** and **empirical research** that advances our understanding about the role, dynamics, and impact of corporations in the creation of sustainable social, environmental and economic value.



**Principle 5 - Partnership:** We will interact with **managers of business corporations** to extend our knowledge of their challenges in meeting social and environmental responsibilities and to explore jointly effective approaches to meeting these challenges.



**Principle 6 - Dialogue:** We will facilitate and support dialog and debate among educators, students, business, government, consumers, media, civil society organizations and other interested groups and stakeholders on critical issues related to global social responsibility and sustainability.



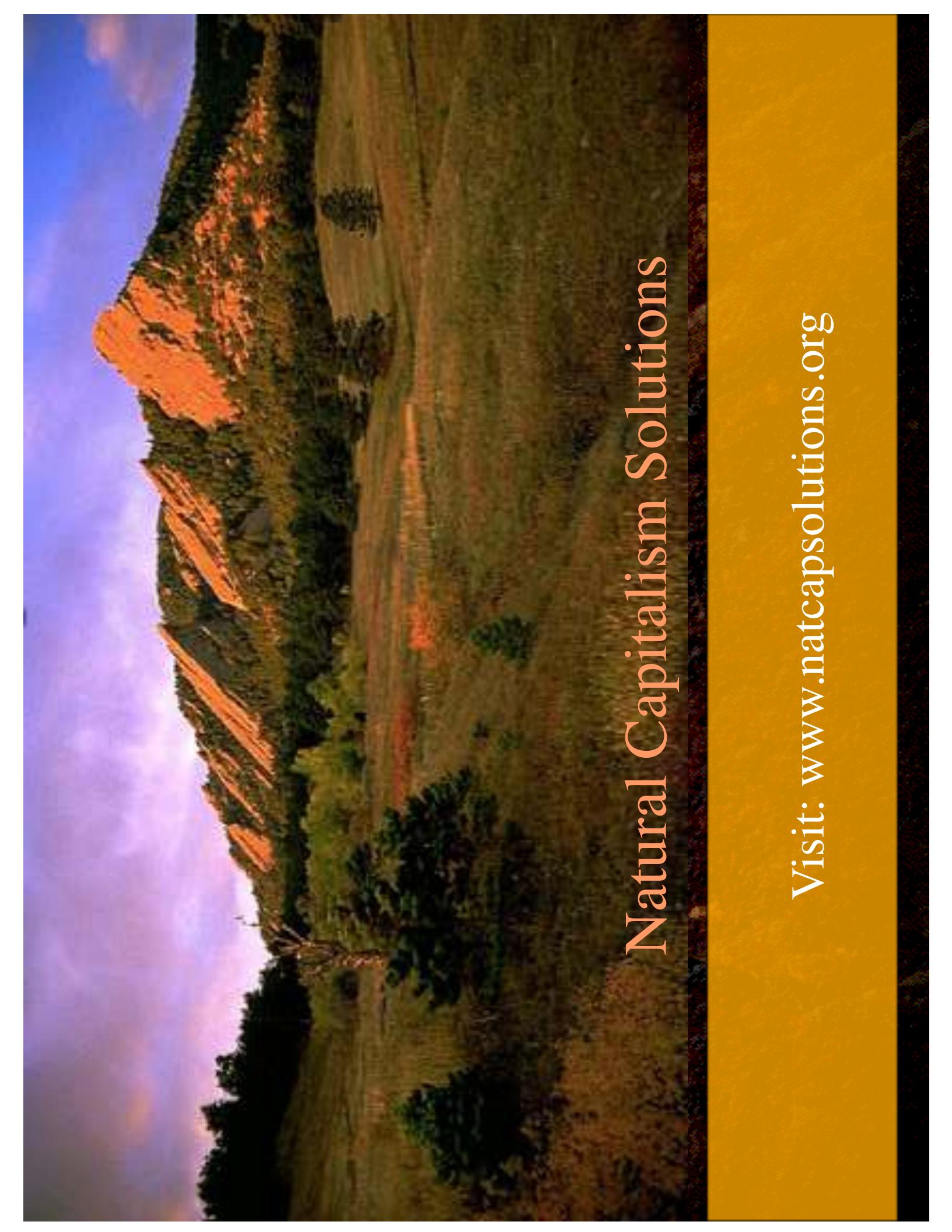


We have achieved a universal legal agreement to limit future man-made climate change, the greatest existential threat to life on earth

We are called to be architects of the future,  
not its victims.

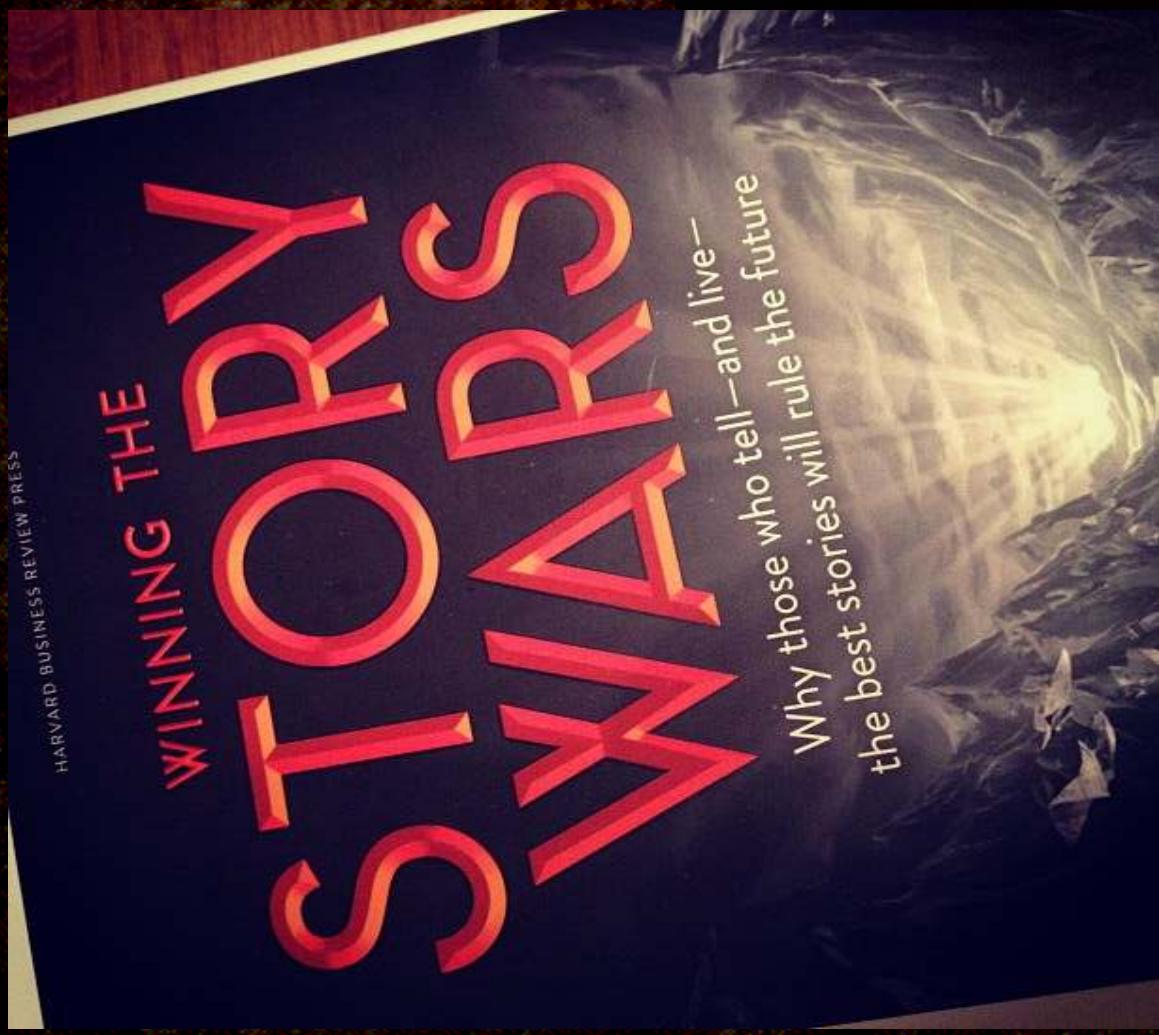
- Buckminster Fuller





# Natural Capitalism Solutions

Visit: [www.natcapsolutions.org](http://www.natcapsolutions.org)



HARVARD BUSINESS REVIEW PRESS



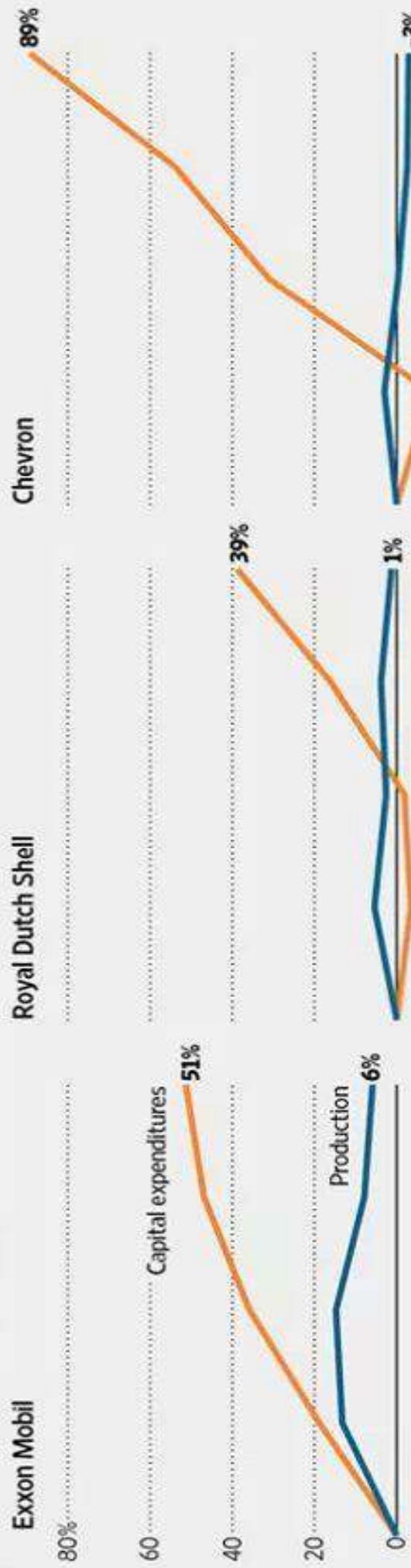
# Jeremy Grantham



Business as usual assumes 3 – 8% GDP growth  
it is likely to be 1% or perhaps zero, well below what  
is needed to service obligations

## Costly Quest

Exxon, Shell and Chevron have been spending at record levels as they seek to boost their oil and gas output. It has yet to pay off.  
Below, change in production and capital expenditures since 2009.



Note: Spending in 2013 reflects company estimates; for Shell it is net of asset sales; production rate in 2013 is through the first nine months.

Source: the companies

The Wall Street Journal



### **Places to Intervene in a System**

1. The power to transcend paradigms
2. The mindset or paradigm out of which the system – its goals, structure, rules, delays, parameters – arises
3. The goals of the system
4. The power to add, change evolve, or self-organize system structure
5. The rules of the system (such as incentives, punishments, constraints)
6. The structure of information flows (who does and does not have access to what kinds of information)
7. The gain around driving positive feedback loops
8. The strength of negative feedback loops, relative to the impacts they are trying to correct against
9. The lengths of delays, relative to the rate of system change
10. The structure of material stocks and flows (such as transport networks, population age structures)
11. The sizes of buffers and other stabilizing stocks, relative to their flows
12. Constants, parameters, numbers (such as subsidies, taxes, standards)

*Donella Meadows*

# How to transform finance

The Fortune 1000 drives

about 50% of  
the global  
economy.

Their cap-ex  
budget drives  
half of global  
impact



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 15 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"

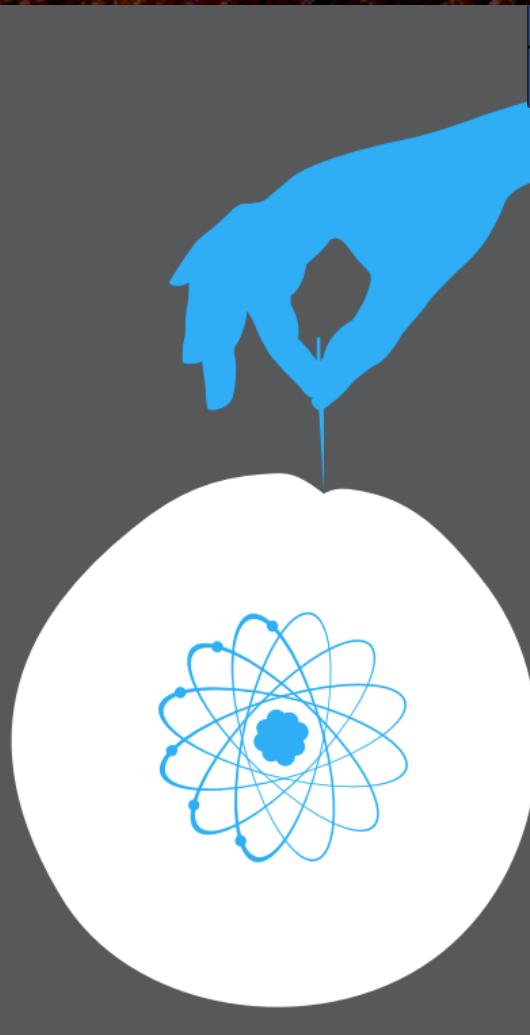
Christiana Figueres UN FCCC

Between 60 to 80% of coal,  
oil & gas reserves of publicly  
listed companies are  
**‘unburnable’** to keep within  
the 2° C limit.



## **Unburnable Carbon –** Are the world’s financial markets carrying a carbon bubble?

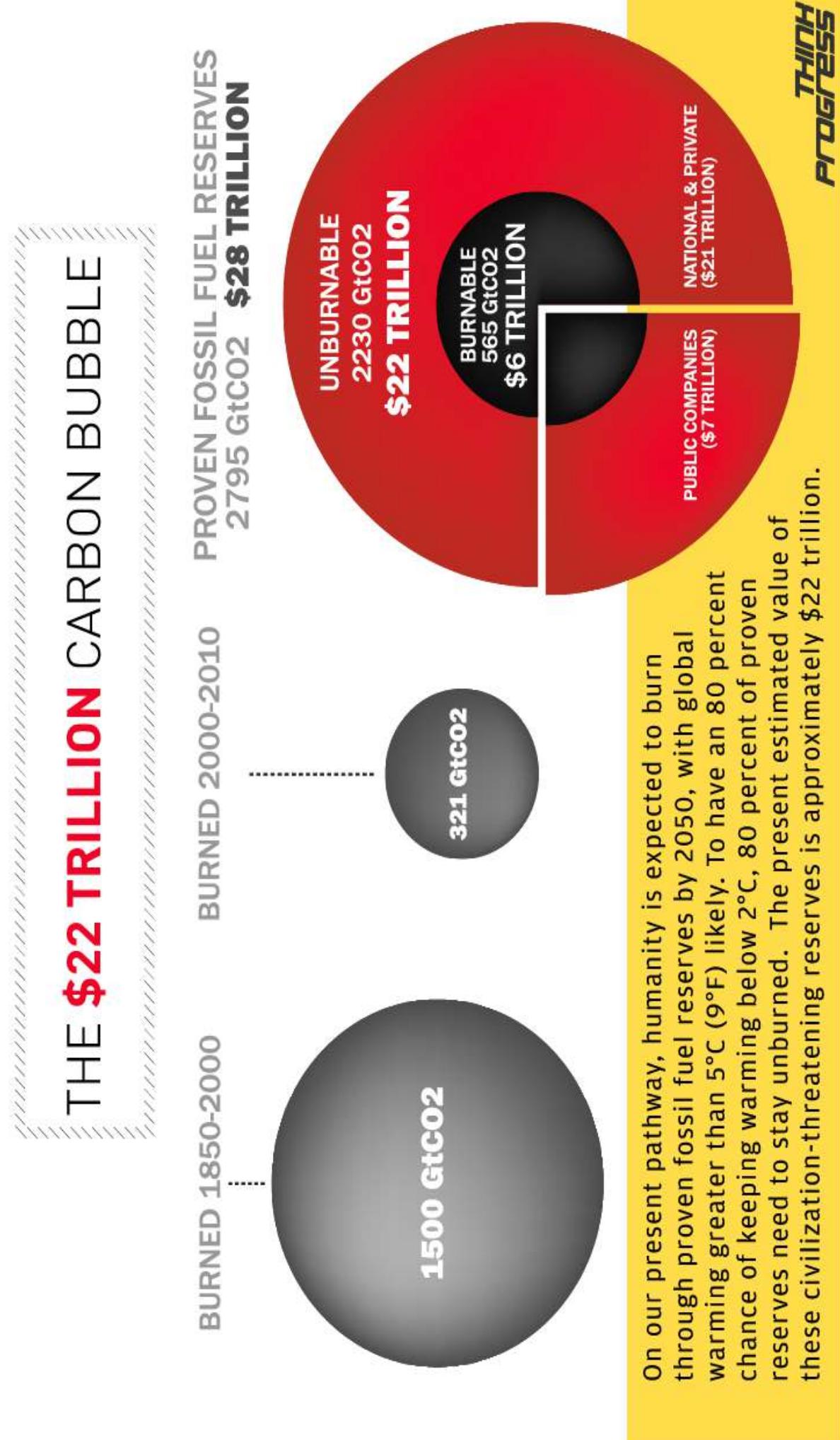
And we continue to search  
for more....



Between 60 to 80% of coal, oil & gas reserves of publicly listed companies are **‘unburnable’** to keep within the 2° C limit.

And we continue to search for more....

# Just as we are in ecological overshoot, so are we in Financial Overshoot



Sources: Meinshausen et al. 2009; Allen et al. 2009; Sokolov et al. 2009; Carbon Tracker Initiative 2011. Carbon reserves as of the start of 2011; since then approximately 50 gigatonnes of carbon dioxide have been burned. Total fossil reserves are projected to be four times larger than proven reserves, and exploration for new reserves continues.

# EMERGREEN DIRECT INVESTING CO-CREATING THE REGENERATIVE ECONOMY

[www.capitalinstitute.org](http://www.capitalinstitute.org)



NO. 5

[www.capitalinstitute.org](http://www.capitalinstitute.org)

Suppose, instead, the big pension funds and endowments invested in and genuinely owned such companies, with like-minded steward investors, and with all associated responsibilities and benefits, 10 or 20% of all real enterprises over the long run.

Initially they would be repaid out of the cash flows of these businesses on perhaps an 80/20 split. Once their investment was repaid with interest, they would derive 20% thereafter

Financial obligations to investors would be 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 though needless and non-value adding transactions: trading shares in a speculative frenzy, buying, selling, merging, leveraging, and recapitalizing companies.

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

# Mount Pelerin Society

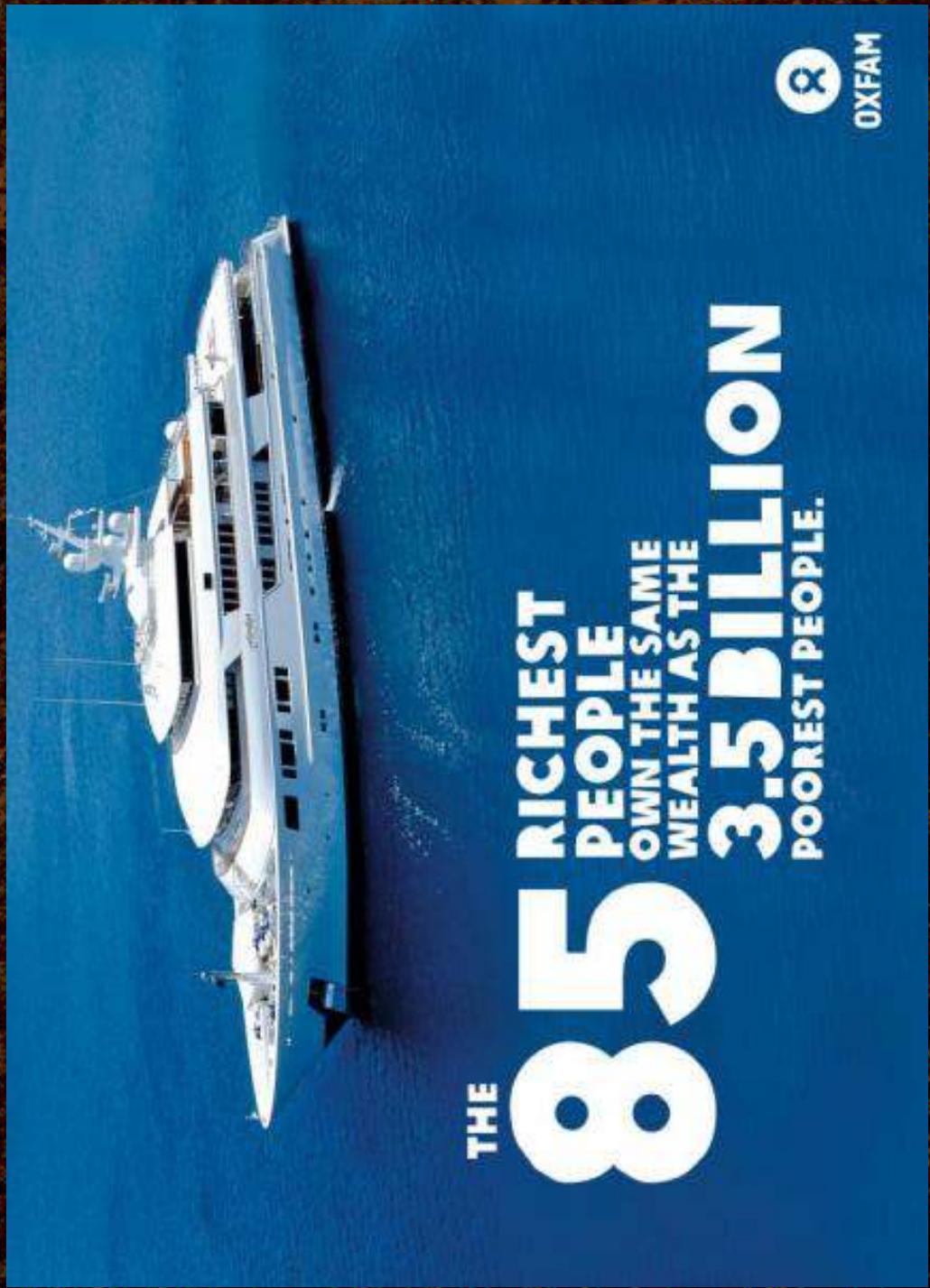


"Columbus did not seek a new route to the Indies in response to a majority directive."

Milton Friedman



And we have huge inequality



THE **85** RICHEST  
PEOPLE OWN THE SAME  
WEALTH AS THE  
**3.5 BILLION**  
POOREST PEOPLE.



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

# Growth Of Family Income

**1947-1979:**  
We All Grew

**1980-2007:**  
We Grew Apart



1947-1979 Source: United for a Fair Economy ([www.FairEconomy.org](http://www.FairEconomy.org)); Based on analysis of US Census Bureau data  
1980-2007 Source: Congressional Budget Office, Average Income Pretax ([www.cbo.gov](http://www.cbo.gov)); 2007 Dollars  
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An-Institut der Stiftung Weltethos  
an der Universität Tübingen

Humanistic  
Management  
**Network**



NATURAL  
CAPITALISM  
SOLUTIONS

CASE  
WESTERN  
RESERVE  
UNIVERSITY



FOWLER CENTER FOR  
BUSINESS AS AN AGENT  
OF WORLD BENEFIT

AMERICAN  
SUSTAINABLE  
BUSINESS  
COUNCIL



the guardian



Ceres



F U T E R R A



Bard MBA  
IN SUSTAINABILITY

IN THE HEART OF NEW YORK CITY



THE WORLD BANK  
IBRD • IDA

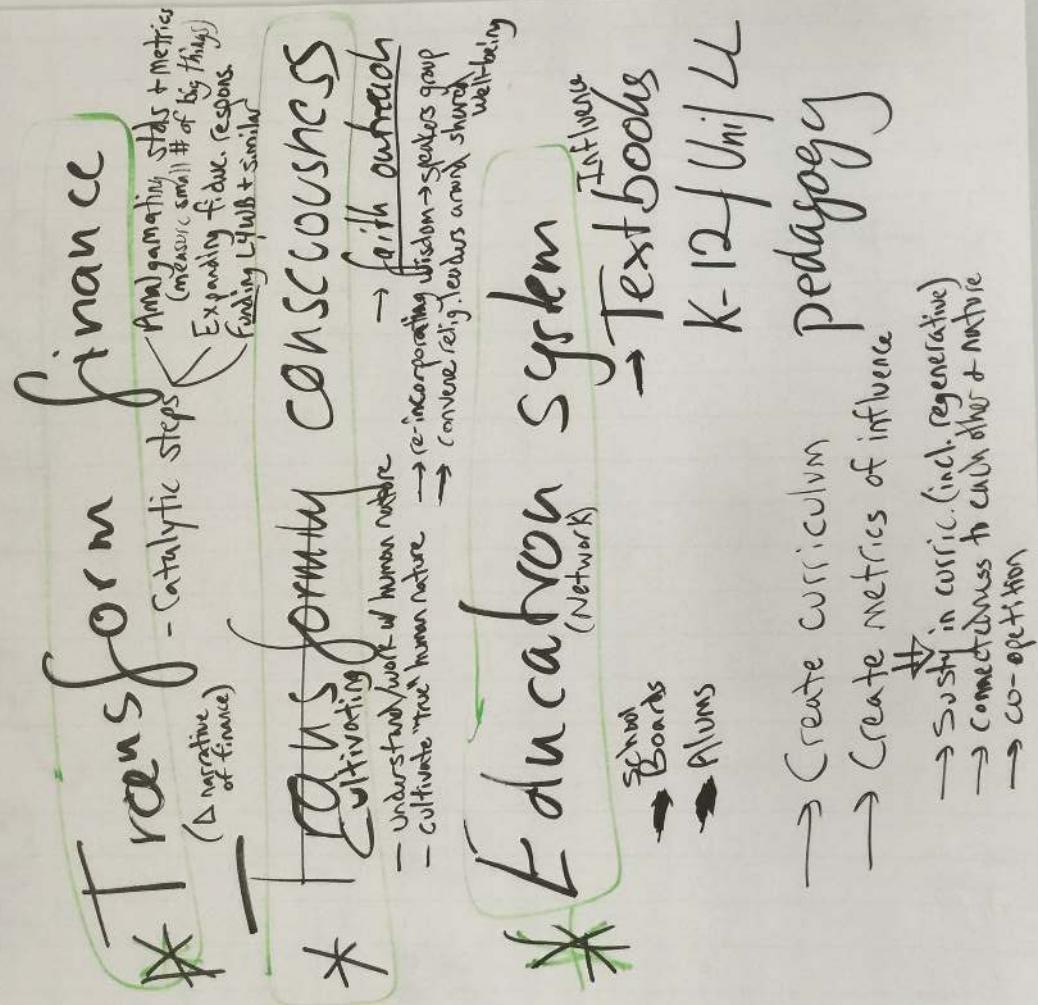
economics

True freedom and success depend on creating a world where we all prosper and flourish.

Institutions serve humanity best when they recognize our individual dignity and enhance our interconnectedness.

To thrive, business, government and society must pivot toward a new purpose:  
shared well-being on a healthy planet.

# ~~MEADAYS~~ MPURELLQ.



## \* Culture Design Lab

(Market Research/Tracking) (Track/

- Strengthen network → Amplification of Narrative
- synthesis of knowledge
  - crowdsourcing database
- track demise of global story
- watch our network evolve

## \* Fundraising

→ secret fanát

## \* Think tank network coordination

→ internships "Trojan Horses"

\* Seeding soil, local failure

- Farm team for these ideas
  - resources, encouragement
  - training & finding opps for young leaders
  - anti-ALEC (legislative)

# New Purpose Business Ans Comachers / with NEEC legislative

(New purpose)  
Business  
consortium

(Anti-New Davos)

卷之三

→ Diversity of  
Geog., race, gender & spanning → Networks  
→ Collaboration

→Collaboration

- Action
- Build power together

~~Global Governance~~ / 4 US

# *Network of Networks*

## Events/Culture Blg

→ Thematic sub-nets

## \* Media Communication Strategy



Relationships - That's what  
differentiates companies.  
Many companies have  
the best thing  
in their  
industry.  
The difference  
is the  
relationships.

① Be  
② Listen  
③ Share  
④ Lead  
⑤ Inspire

EXIT