



The Clean Energy Transition



## The New Energy Era

Better choices  
It's working



## Massive Markets

Electrifying everything  
The rise of clean energy  
The fall of fossil fuels



## Communications

Solutions vs naysayers  
Transition benefits  
Fossil reality check



## Cultural Shift

The tipping point



## The Goal

Bend the curves



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# **We've Been Tethered to Fossil Fuels**

## **Abundant lifestyles, at a cost**

### **IN THE PAST**

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**Want clean energy?  
Lobby congress? Ask your utility?  
Protest energy companies?**



# Freedom to Choose

## Innovation breaks the chains

### IN THE PAST

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Want clean energy?  
Lobby congress? Ask your utility?  
Protest energy companies?



### NOW

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People can take direct action



We are the first generation  
with clean energy choices

# Consumers have Better Energy Choices

## The power of the market unleashed



### PRODUCT INNOVATION

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- ✓ Better performance
- ✓ More convenience
- ✓ More value



### MARKET OPPORTUNITY

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Over the next two decades we will invest \$200 trillion rebuilding our energy economy (BNEF)

# CASE STUDY: ELECTRIC CARS



THE SAFEST CARS AVAILABLE

LOW CENTER OF GRAVITY, CRUMPLE ZONES, NO GAS ENGINE



LOWEST PROBABILITY OF INJURY

TESTED BY NHTSA

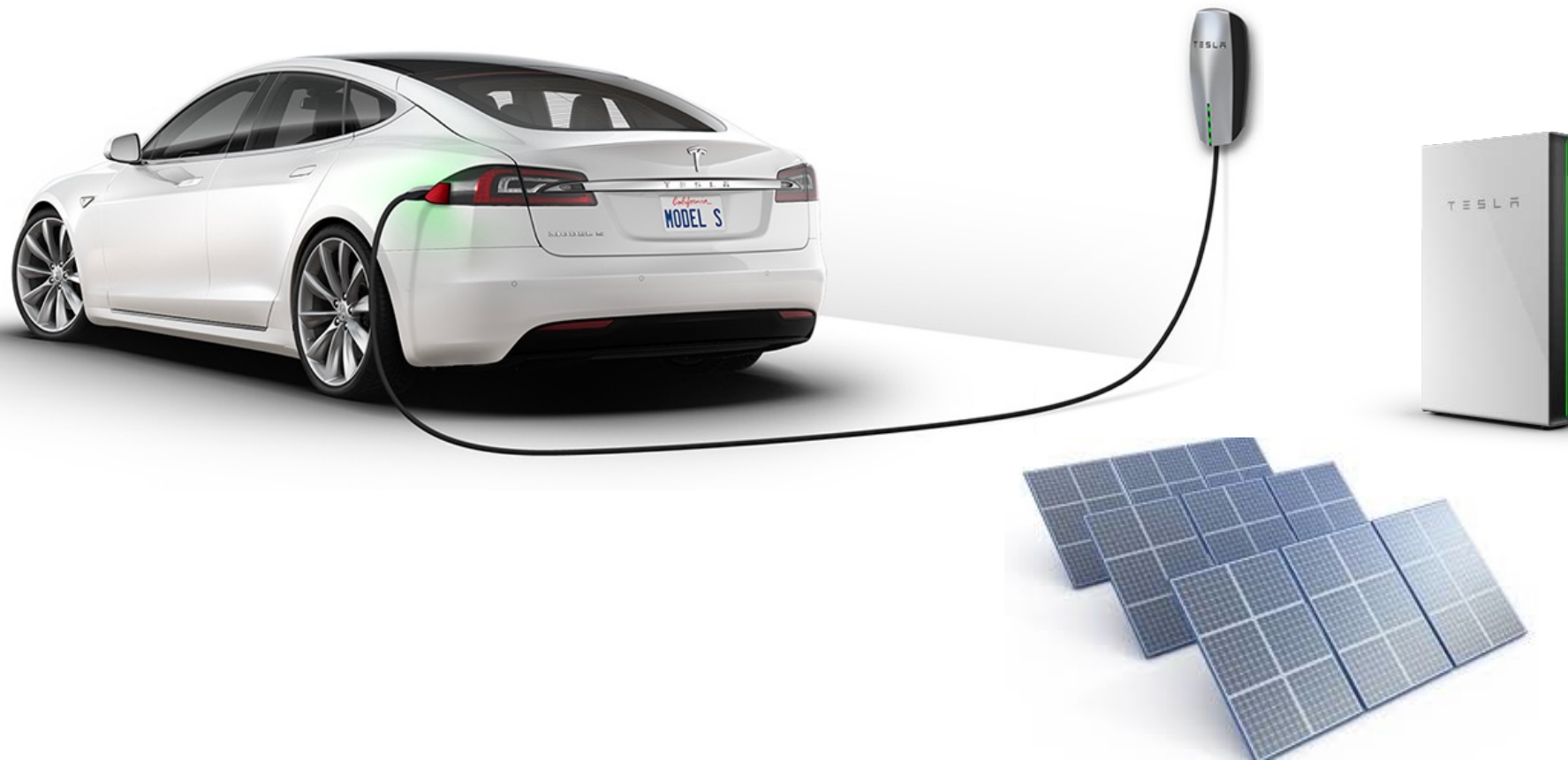
RELAX

QUIT YOUR PART-TIME JOB PUMPING GAS



DRIVE ON SUNSHINE

**LOCAL ENERGY**



## Fast Followers

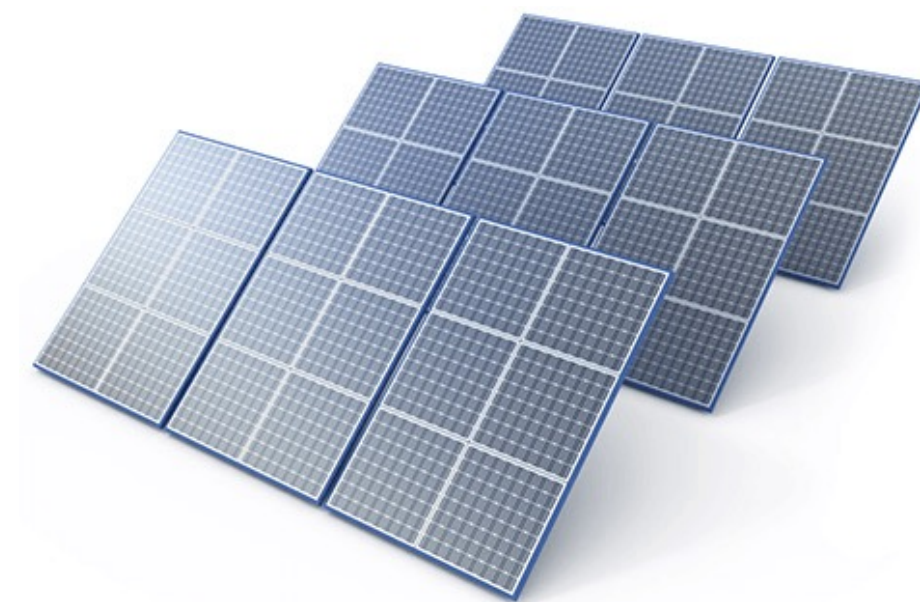
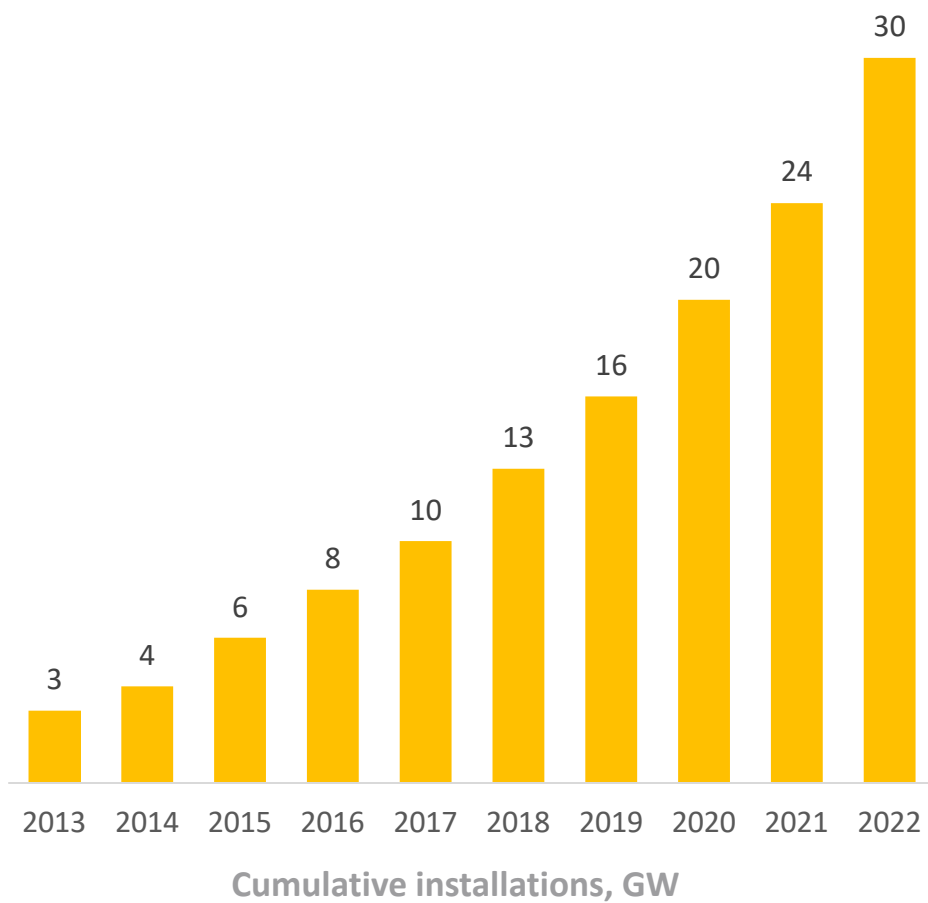
Most major brands are going electric



It's Working

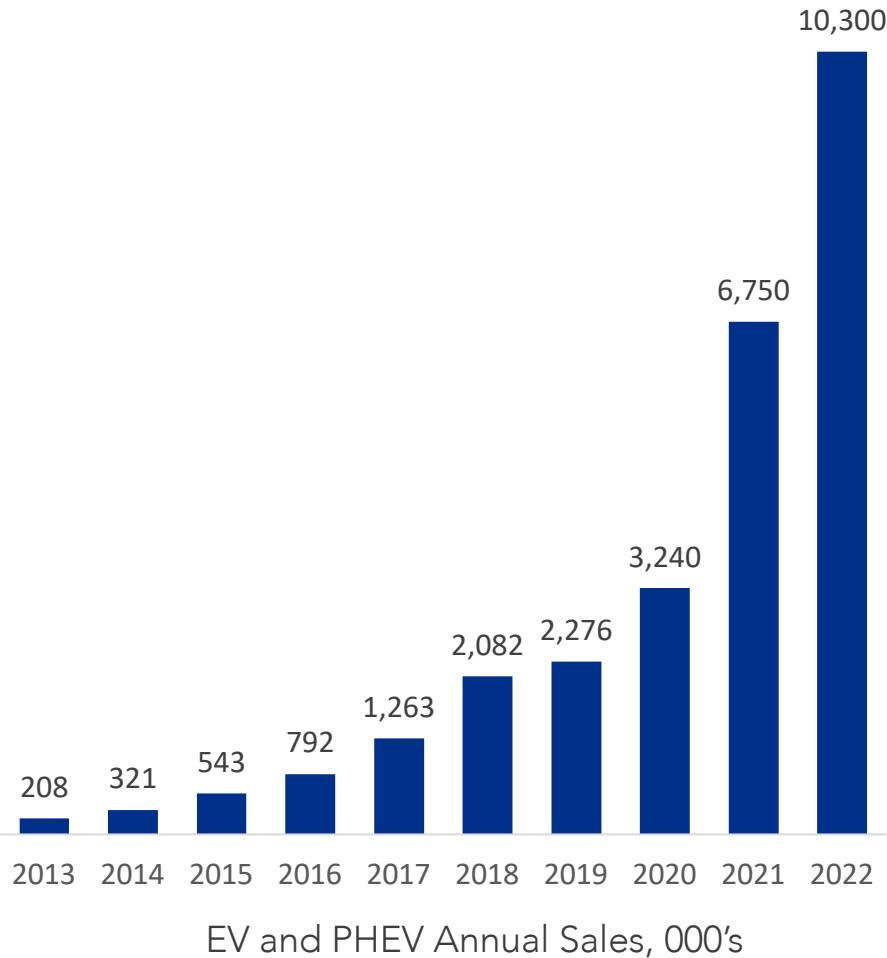
# U.S. Residential Solar Capacity

Millions of homes already powered by solar



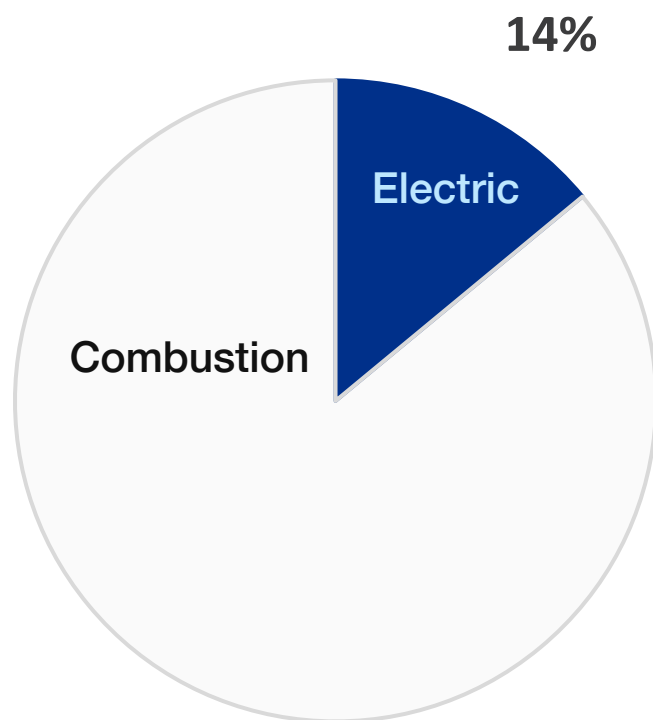
# Global Electric Vehicle Sales

## Going mainstream



# Global Electric Vehicles

## Market share



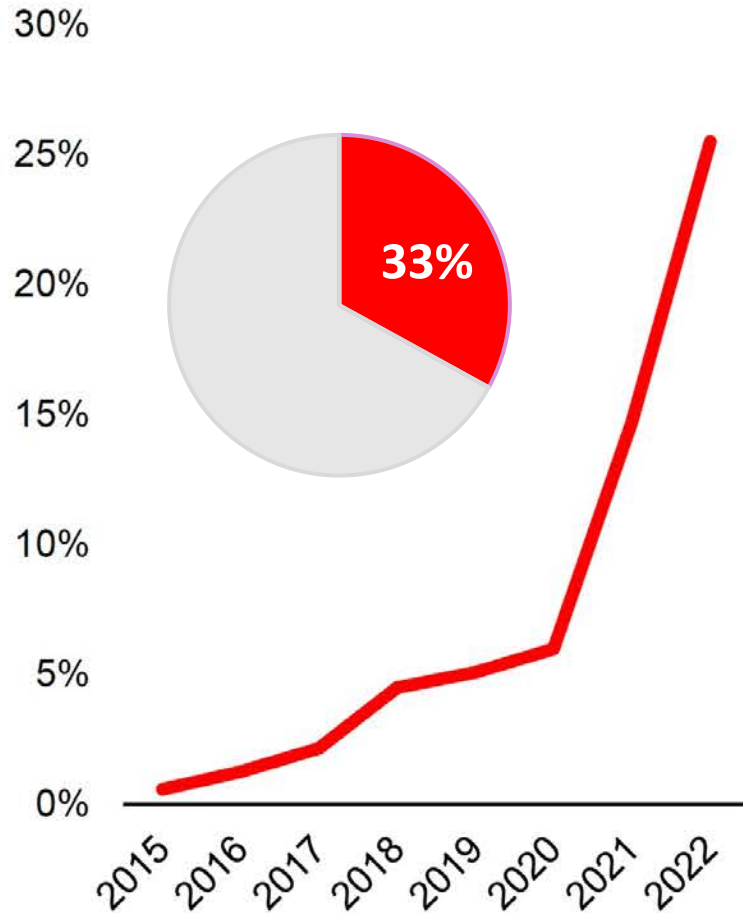
New Passenger Vehicle Sales  
2022



# China

## World's Largest Market

### EV sales share



# Breaking News!

## Major milestone

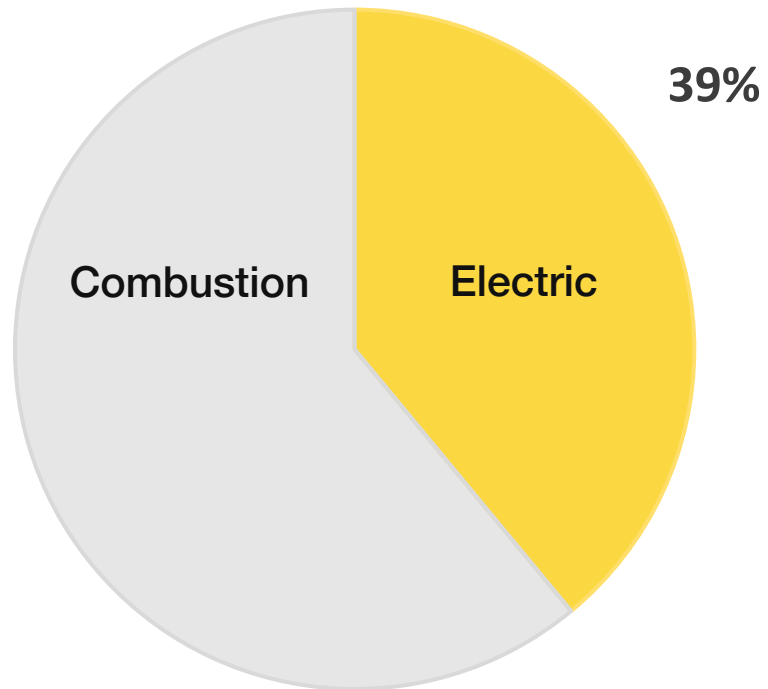
WORLD'S BEST-SELLING CAR – Q1 2023



**TESLA MODEL Y**

# Global Electric Scooters

## Market share

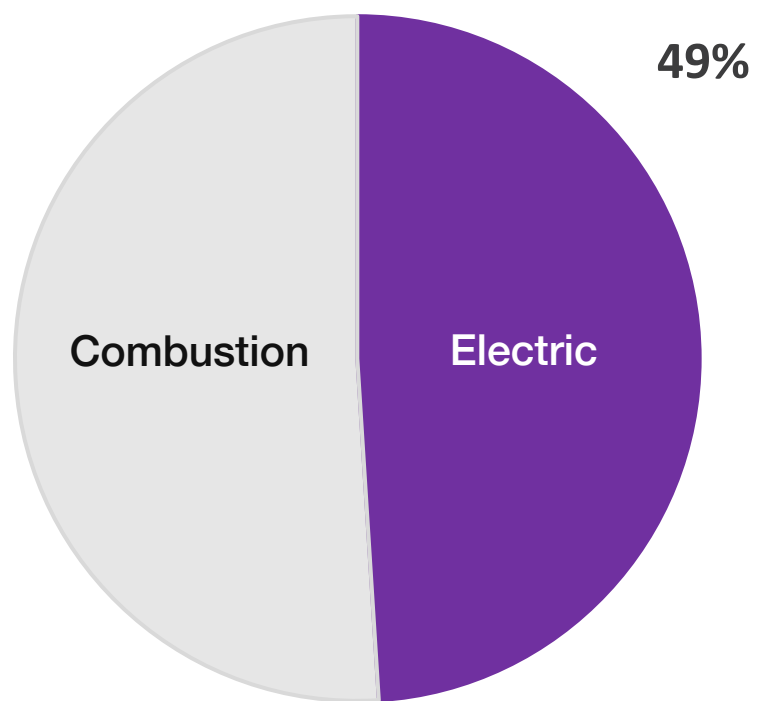


New Scooter Sales  
2022



# Global Electric Buses

## Market share



New Bus Sales  
2022

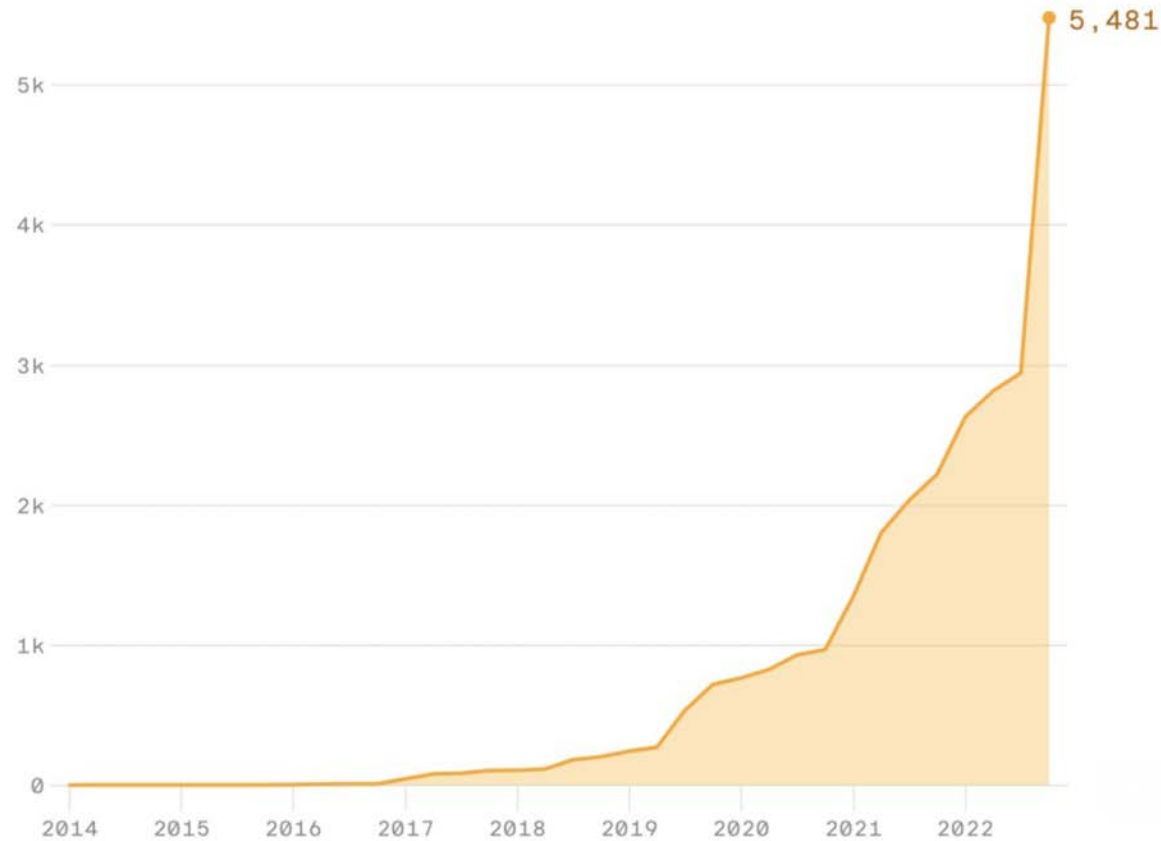


# Electric School Buses

Healthier, more economic, community resilience

Cumulative electric school bus commitments, U.S.

Quarterly; Q1 2014 to Q4 2022





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Solutions vs naysayers  
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## Cultural Shift

The tipping point



## The Goal

Bend the curves

## Electrifying Everything

Commerce is the engine of change

IT'S SIMPLE...

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Anything fossil fuels can do,  
electricity can do better



MORE RELIABLE - No pull cord

MORE CONVENIENT - No fuel mix

CLEANER, BETTER - No pollution

# Electrifying Everything

## New, better choices



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# Electrifying Everything

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# Electrifying Everything

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# Electrifying Everything

## New, better choices



# Electrifying Everything

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# Electrifying Everything

## New, better choices

**Children in homes  
with gas stoves have  
a 42% higher chance  
of developing  
asthma**

**-Science Times**



Induction cooktop



Heat pump

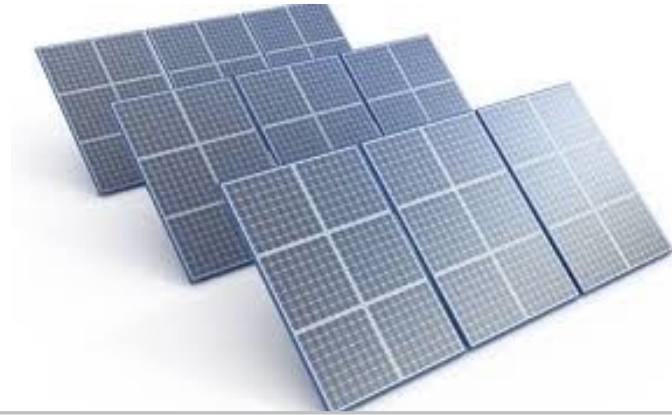


Heat pump water heater

FULLY-ELECTRIFIED FOSSIL-FREE HOMES

## Electrifying Everything

### New, better choices



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This truck can power your home for up to ten days - or more with solar  
More self-reliance and resiliency during power outages  
Vehicle-to-home energy

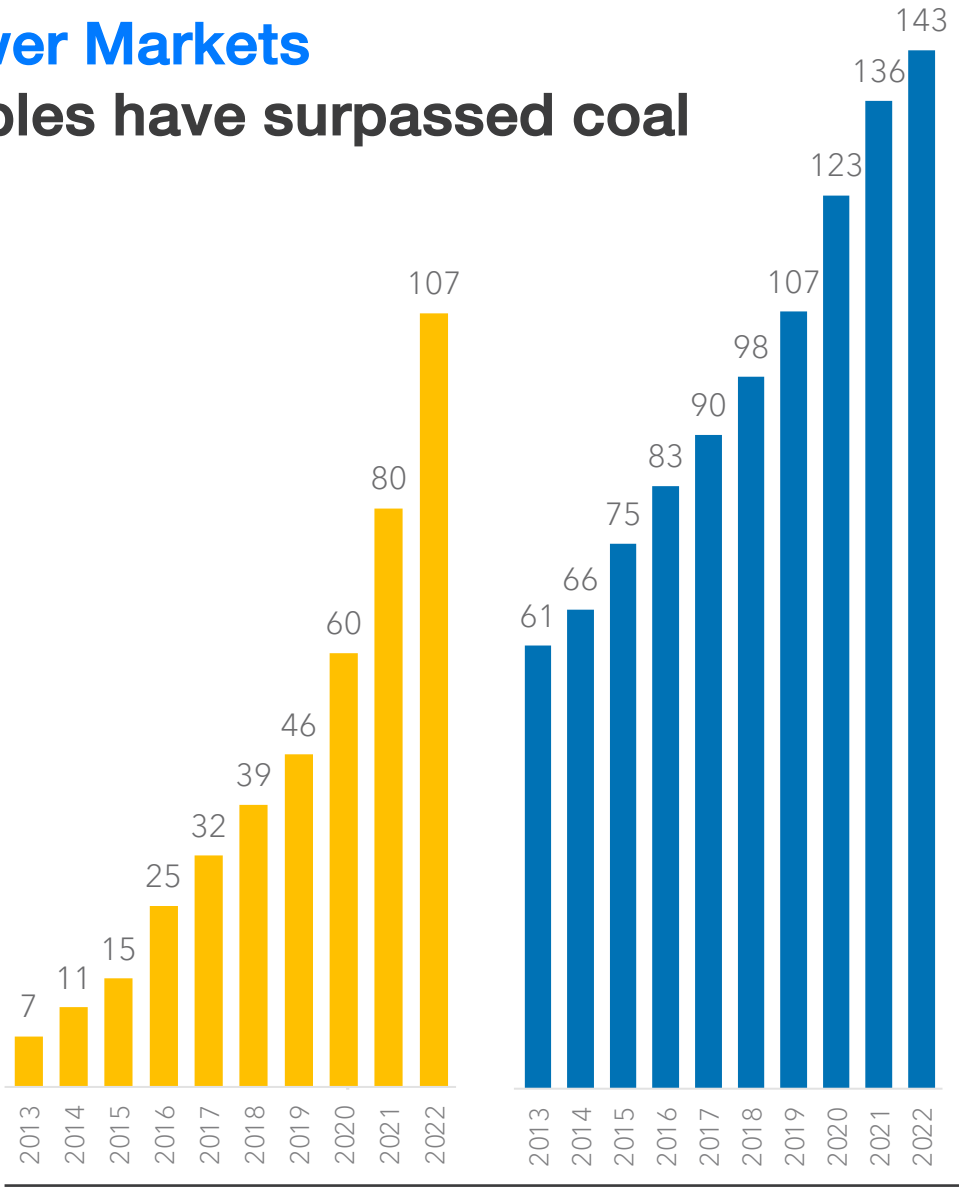
# The rise of clean energy

Global trends are obvious

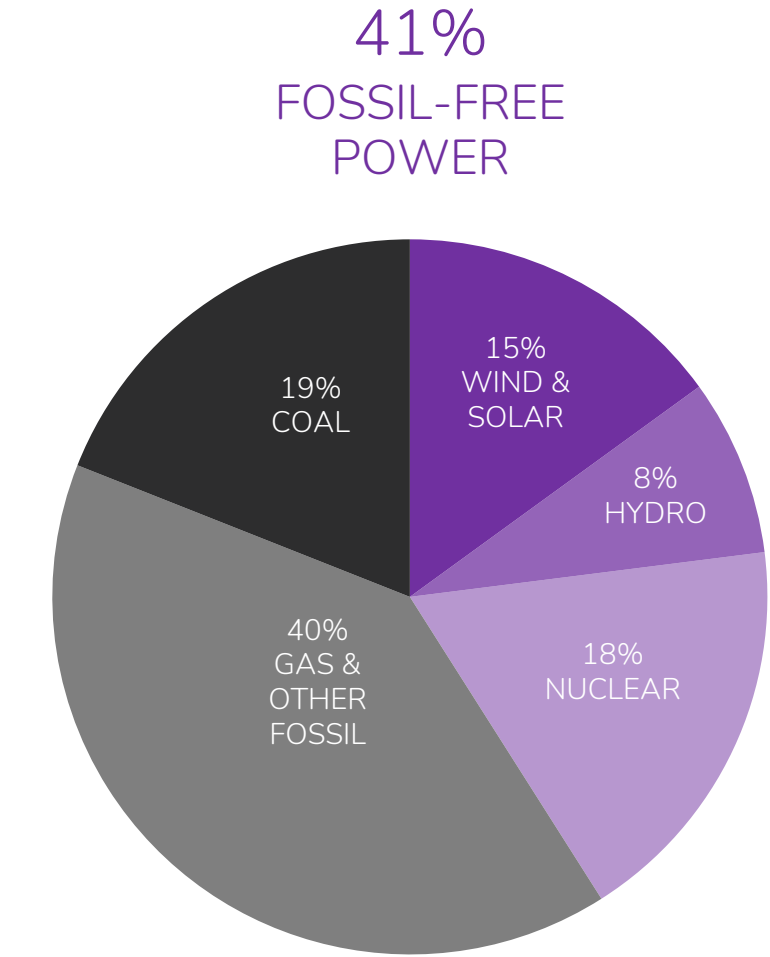


# U.S. Power Markets

## Renewables have surpassed coal



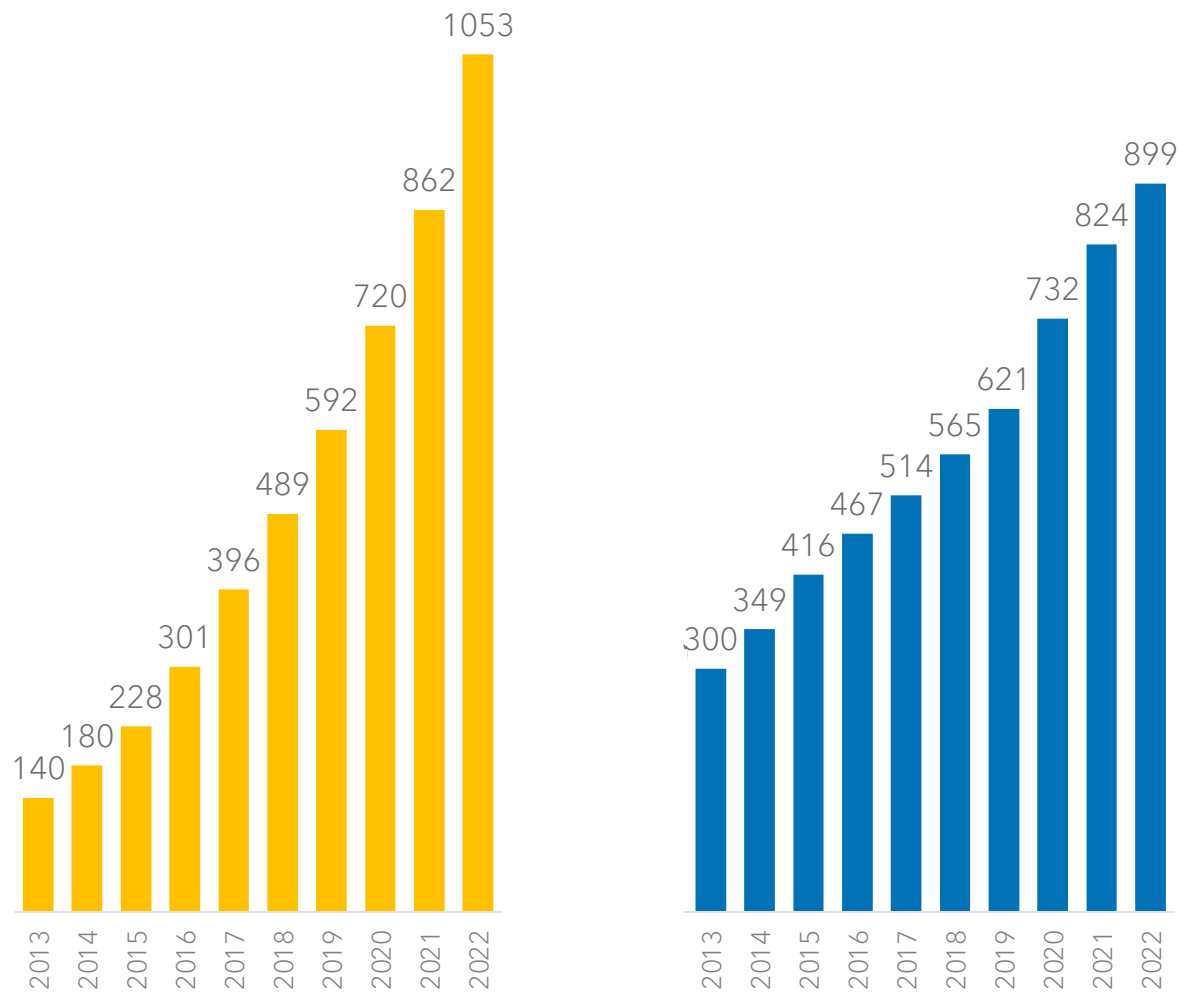
U.S. SOLAR AND WIND CAPACITY  
(CUMULATIVE GIGAWATTS; UTILITY SCALE)



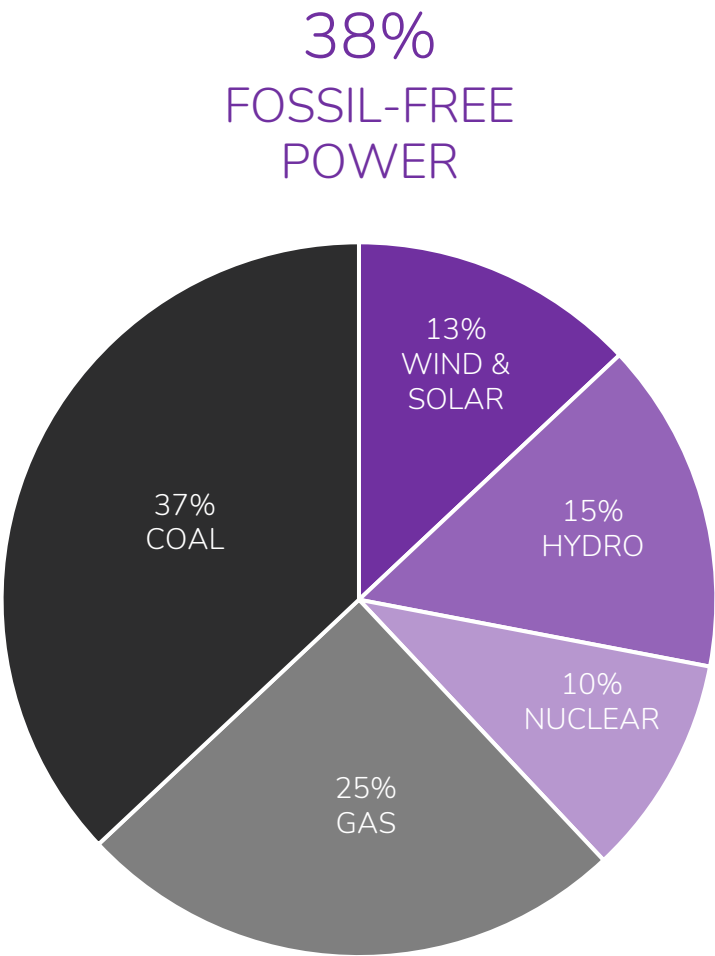
U.S. POWER MIX  
(KWH SUPPLIED BY ALL SOURCES, 2022)

# Global Power Markets

## Renewables are a global phenomenon



**GLOBAL SOLAR AND WIND CAPACITY**  
(CUMULATIVE GIGAWATTS)

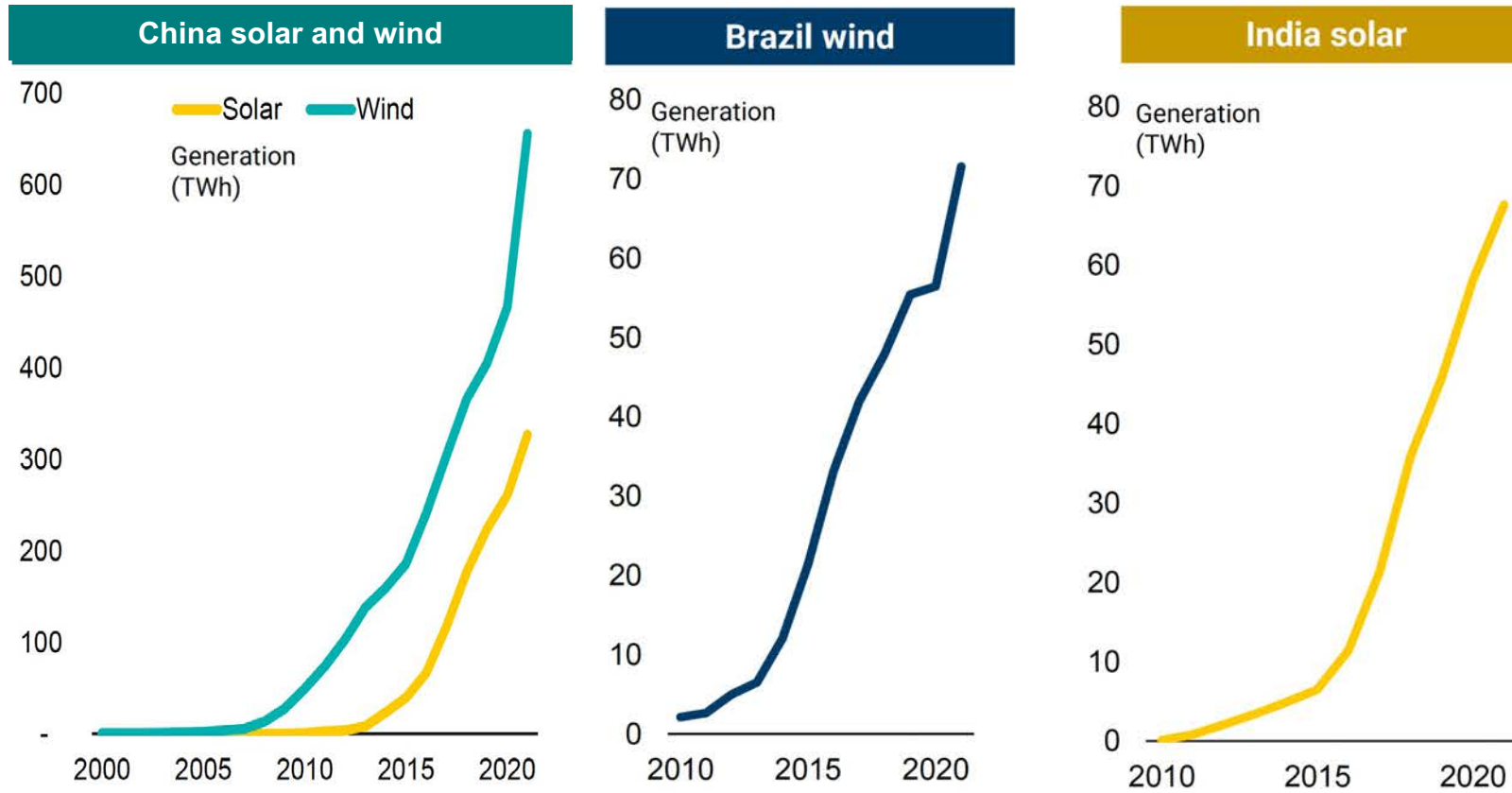


**GLOBAL POWER MIX**  
(KWH SUPPLIED BY ALL SOURCES, 2021)

Source: BNEF, 2022; IRENA Capacity Statistics, 2023, 2018; IEA, Wind Electricity report Sept 2022; Nuclear Capacity, Reuters –IEA June 2022

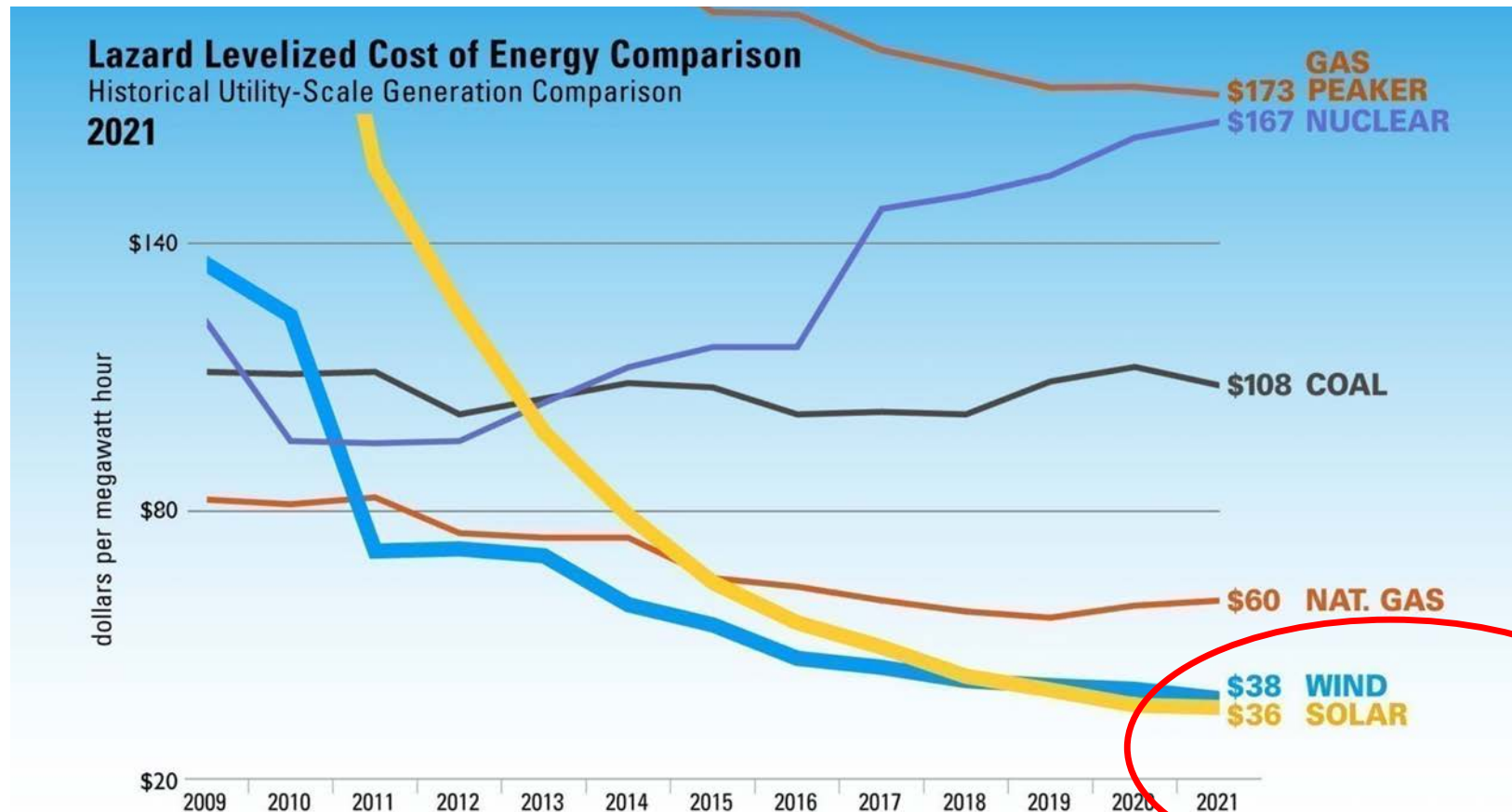
# Global Progress

## Embracing cheap, clean energy



# We Have Made Renewables the Lowest Cost Of Energy

## Stunning advances...fossil fuels can't keep up

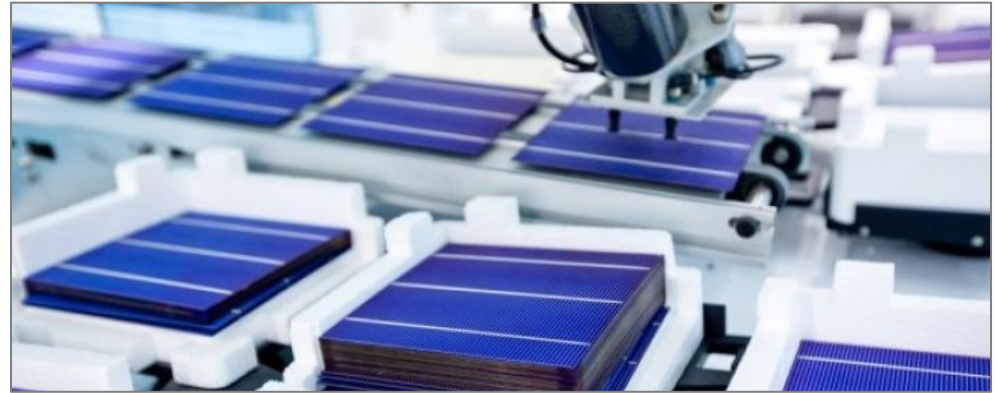


# Replacing Fuel with Innovation

## No mining, drilling, or burning



Mine, drill, transport and burn fuels



Fuel delivered on-site for free, does not deplete  
Production is modular, scalable, automated  
Near-zero pollution or water use

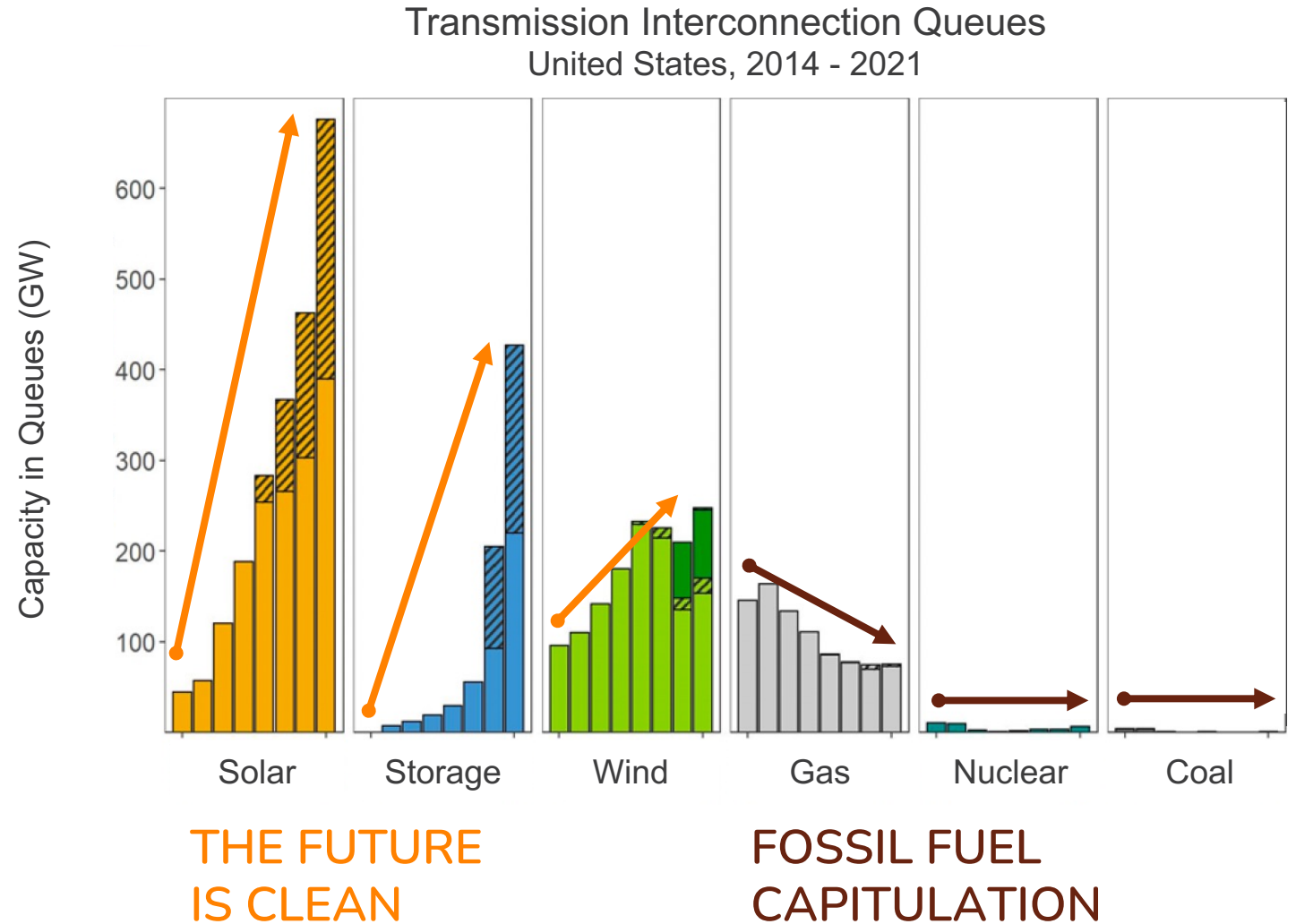
# The Stampede to Clean Energy

## Investment trends are obvious

This graph shows U.S. interconnection applications for prospective new power plants. All new power plants must go through the application process.

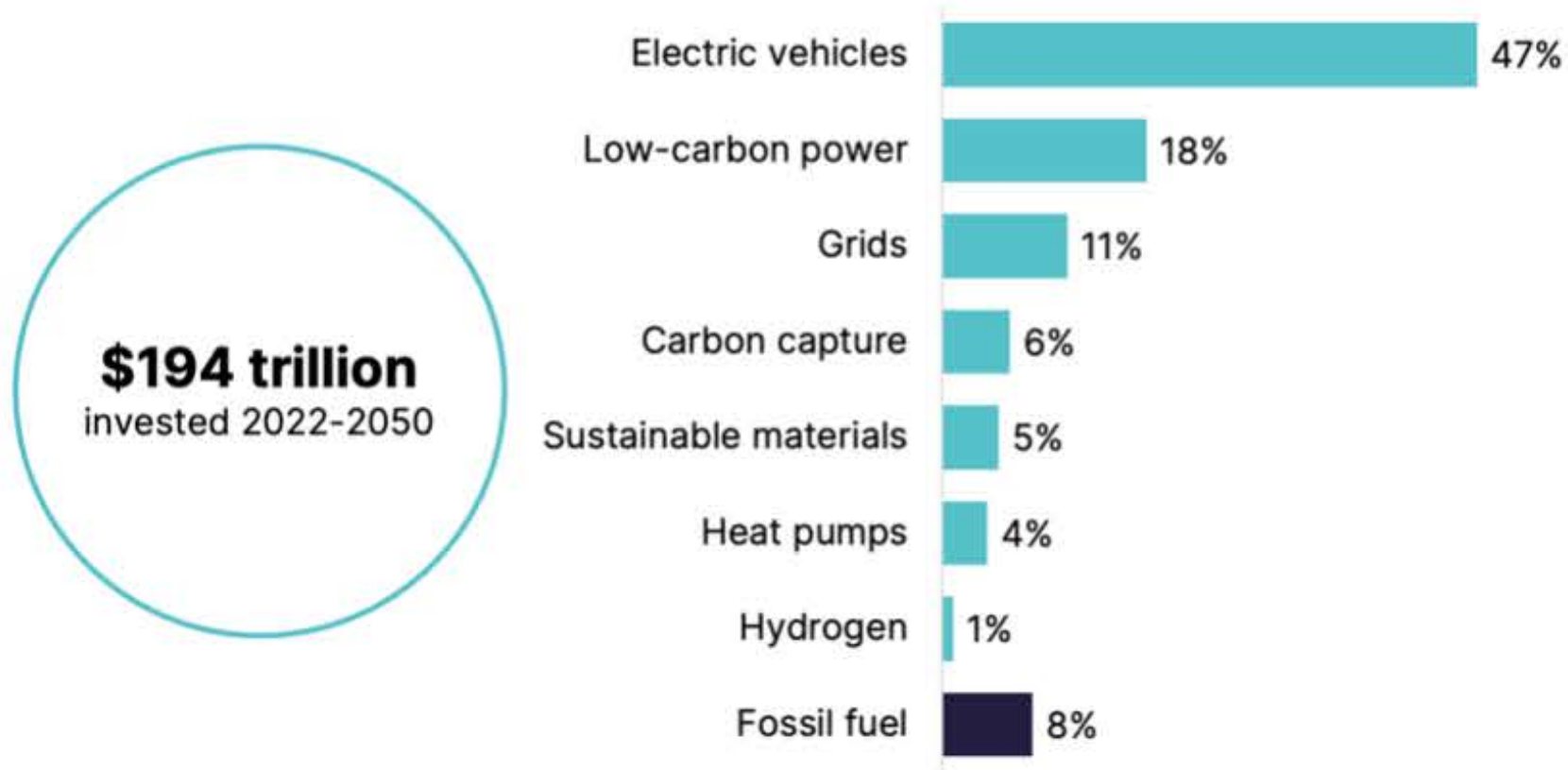
The data shows where the industry is spending risk capital; it is a leading indicator of future capacity additions and the overall market sentiment.

Completing the process is a multi-year effort that can cost millions, so only serious projects apply. Often the study results show no grid capacity, or that connecting will be uneconomic, many drop out prior to completion.



# Massive Investments Ahead, for Decades

## Commerce is the engine of change



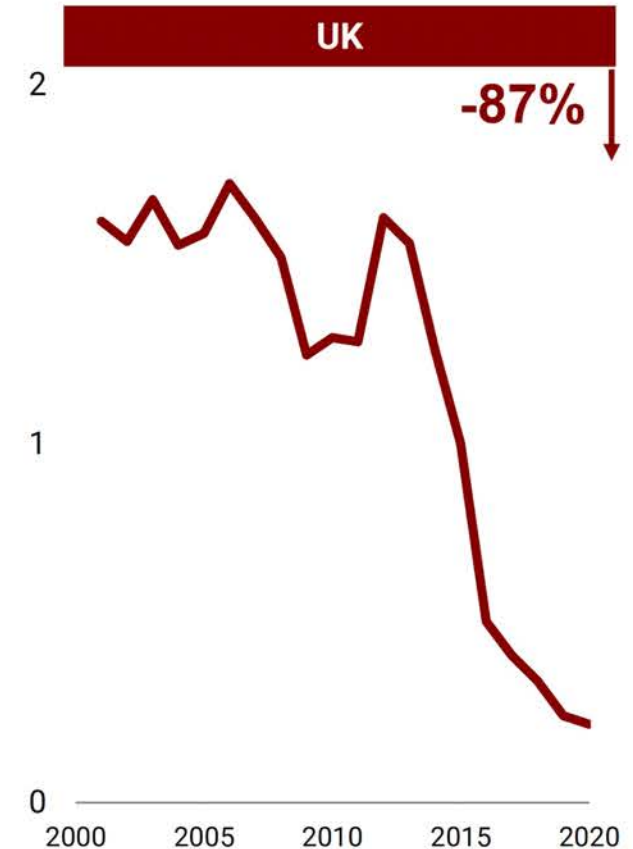
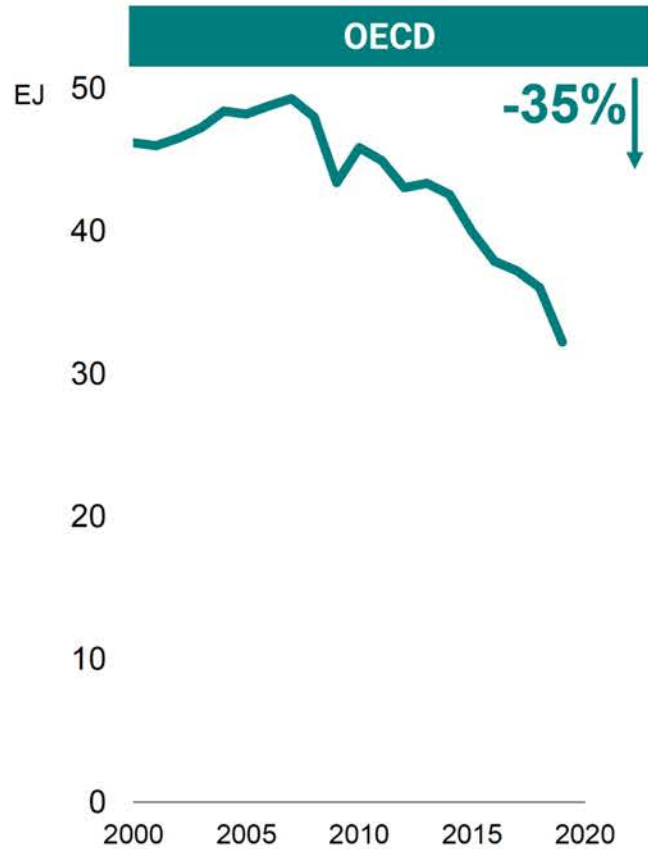


# The fall of fossil fuels

Negative trends abound

# Demand for Coal

## Sharp declines

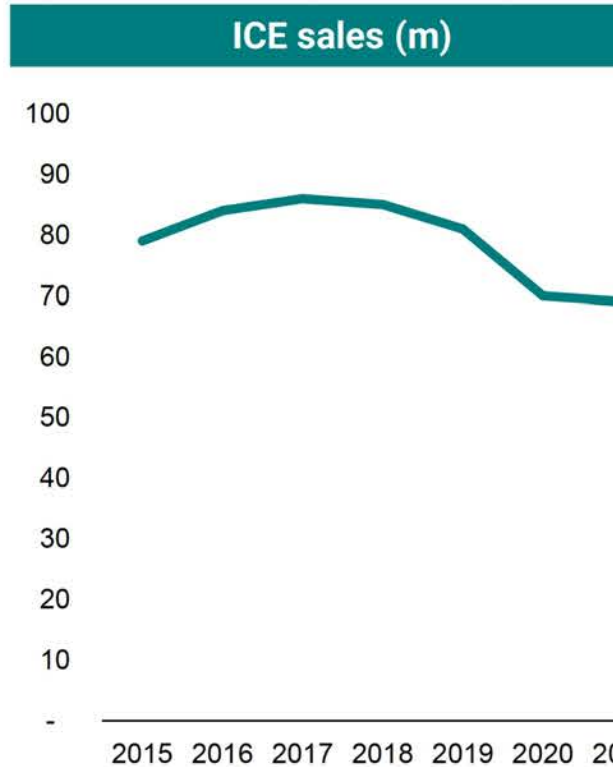


RMI – Energy. Transformed.

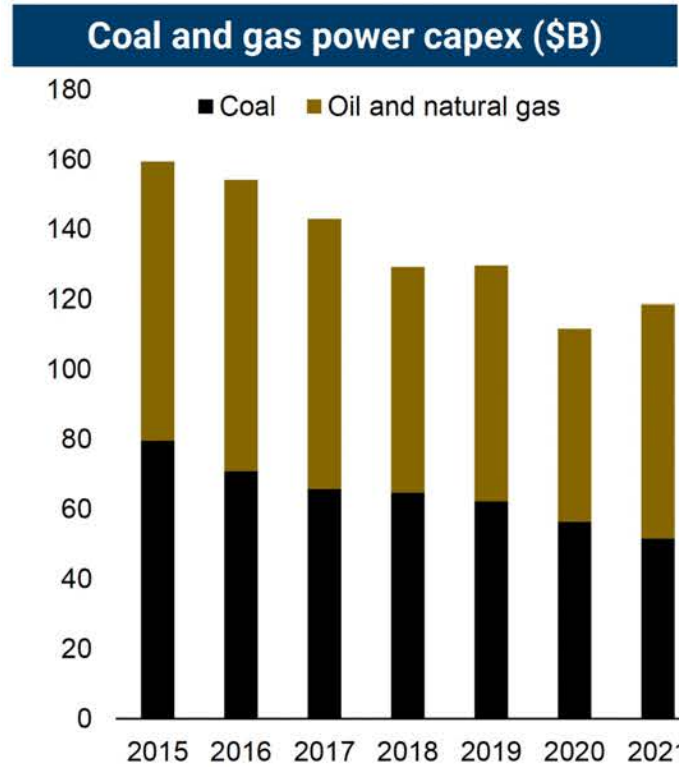
Source: IEA WEB

# Investments Stagnating

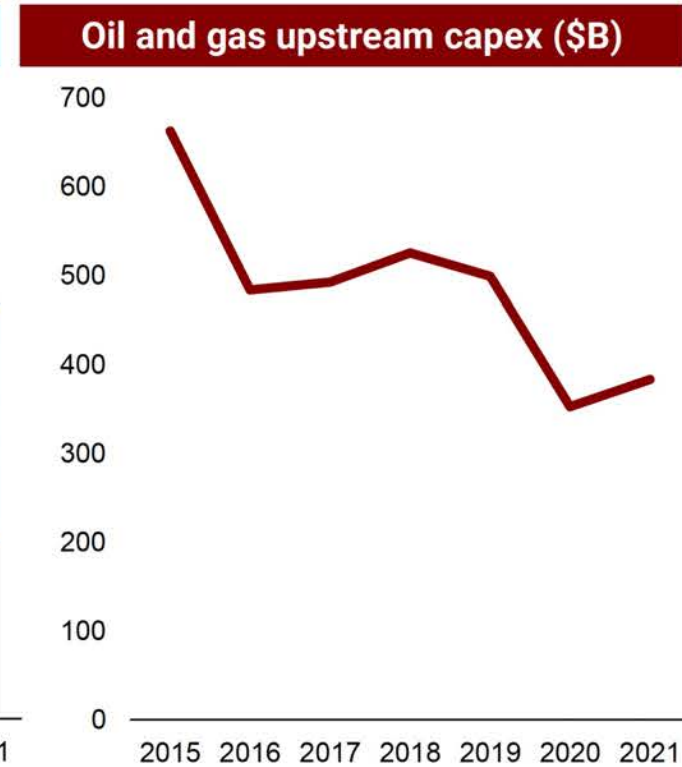
Risk adjusted returns increasingly unattractive



ICE sales are down by 20% since 2017.



Fossil fuel power station capex is down 26% since 2015.



Oil and gas upstream capex is down 41% since 2015.

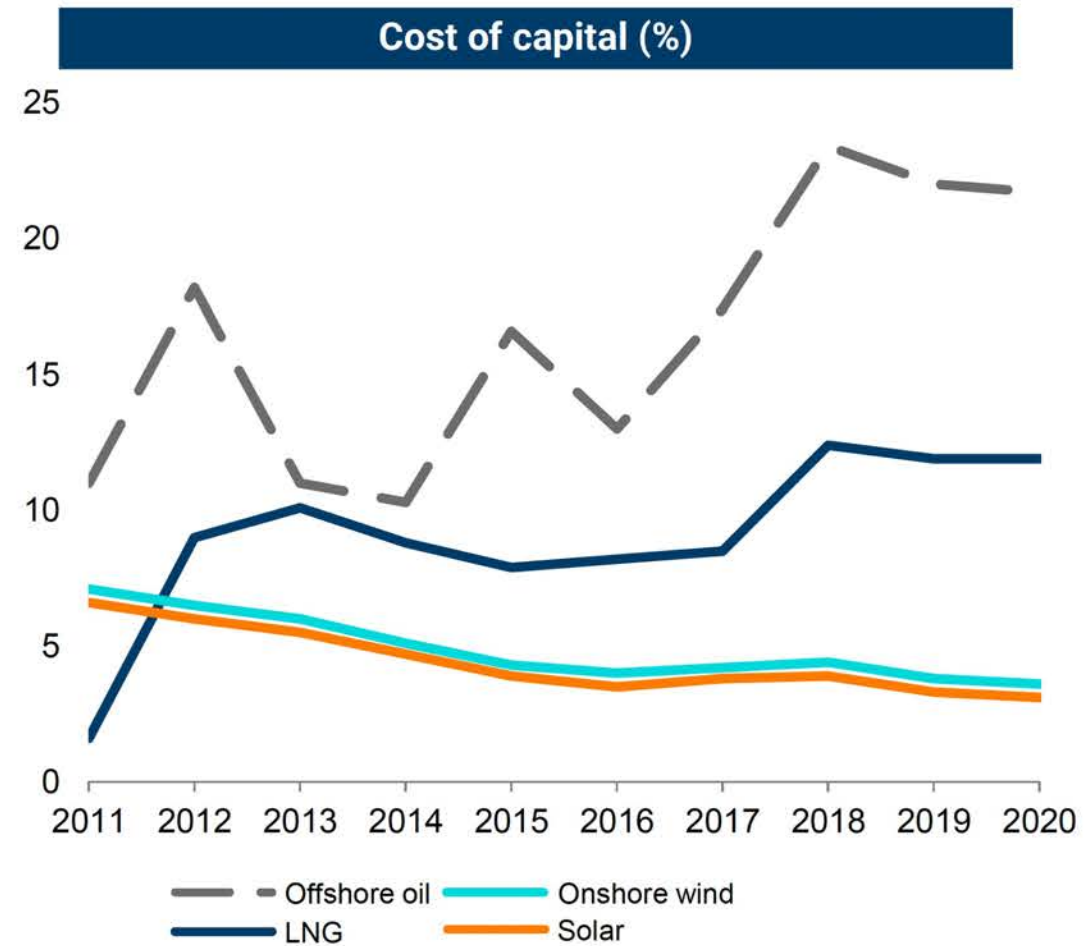


RMI – Energy. Transformed.

Source: BNEF, IEA WEI

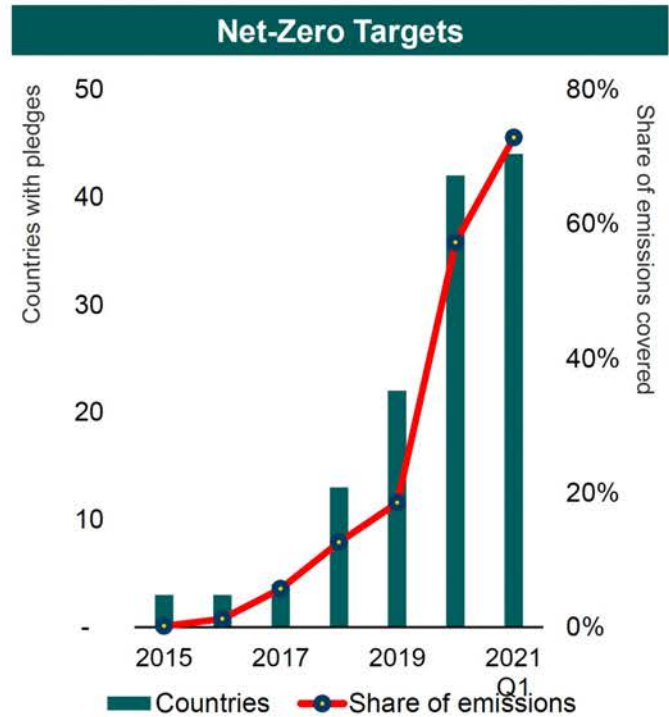
# Cost of Capital

## Pricing expected risks and returns

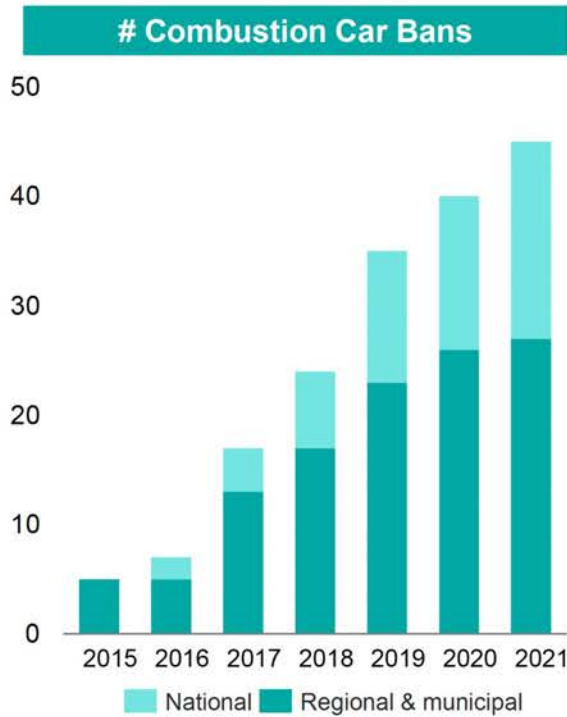


# Meaningful Policy Shifts

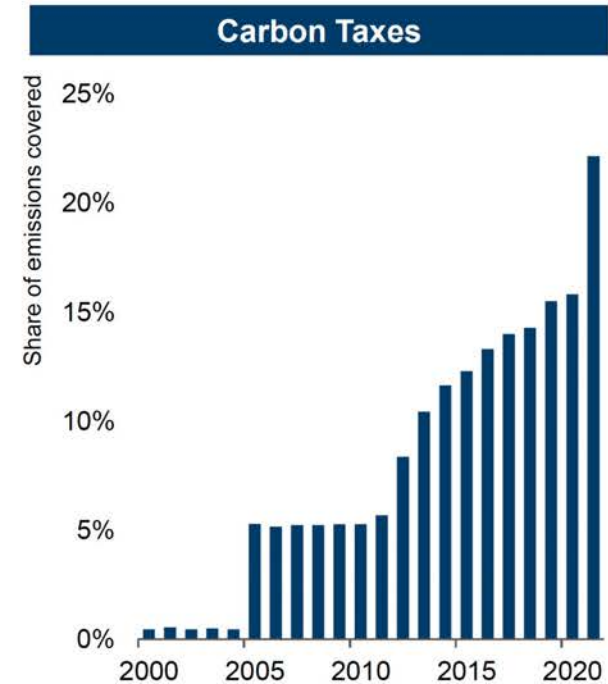
U.S. momentum is building with passage of recent IRA and Infrastructure bills



In 2022, over 90% of the world by GDP had set net-zero targets, up from 6% in 2017.



Fifty countries and regions are planning to ban ICE cars.



The share of emissions covered by tax has increased fourfold in a decade to nearly a quarter.





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The tipping point






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Bend the curves

## We Have Everything We Need to Transition To Clean Energy

Even “difficult” sectors have well-funded solutions scaling up

Electricity and Thermal Storage	Decarbonizing Steel and Concrete
 The logo for Form energy, featuring the word "Form" in a large, bold, black sans-serif font, with "energy" in a smaller, black sans-serif font below it. The text is enclosed within a thin, orange rectangular border.	 The logo for electra, featuring the word "electra" in a dark blue, lowercase sans-serif font. A small, stylized leaf icon is positioned above the letter "t".
 The logo for RONDO, featuring a circular icon on the left with a gradient from yellow to orange to red, and the word "RONDO" in a bold, dark blue, uppercase sans-serif font to its right.	 The logo for brimstone energy, featuring a stylized green and blue leaf-like icon above the word "brimstone" in a bold, black, lowercase sans-serif font, with "energy" in a smaller, green, lowercase sans-serif font below it.

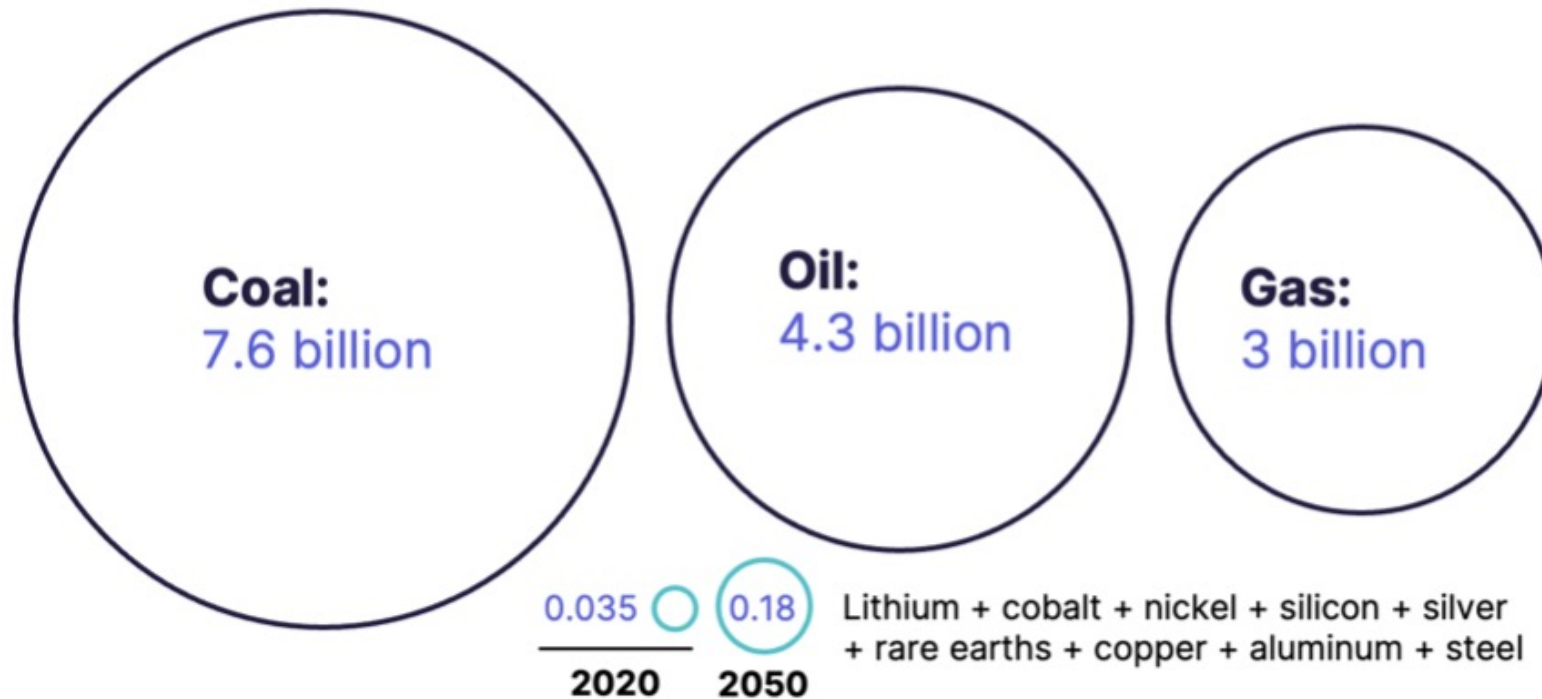
# The Energy Transition Will Require Less Minerals and Mining

## Fossil fuels extract far more materials than clean energy

### 15B tons of hydrocarbons are extracted a year

Extraction of energy transition metals is (and will be) minuscule compared to coal, oil, and gas

Tonnes of annual production, 2019



# Transition Benefits

## So much upside

### We'll Save Water



**Almost 50%**  
of our water is drawn by  
thermal energy  
generation

9% Other

11% Public

33% Agriculture

47% Power Plants

United States Water Withdrawals

### We'll Breathe Easier



**Over 70%**  
of air pollutants come  
from the power and  
transportation  
sectors

12% Other

15% Public

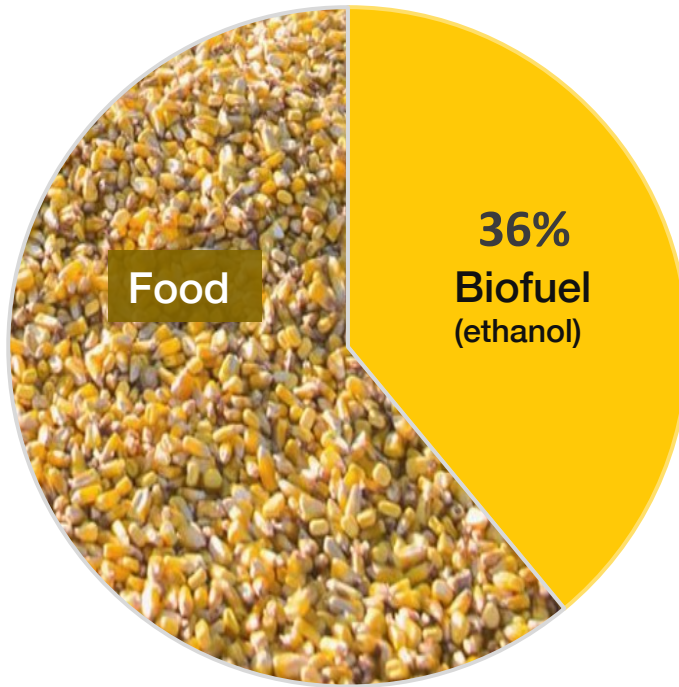
27% Power Plants

46% Transportation

Sources of Primary Pollutants

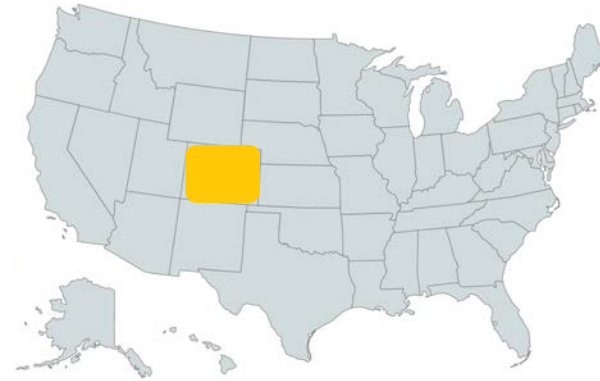
## Transition Benefits

EVs don't use biofuels



Much of the U.S. corn crop is used as biofuel

Biofuels consume vast amounts of land, fertilizer and energy



## Transition Benefits

**Fossil Fuels comprise 40% of Global Shipping**



**Solar panels are a miracle**  
**They turn sunlight into cold beer**



# We're curtaining fossil fuels

## Social pressure is working

### Moral License Revoked

Religious leaders calling for transition away from fossil fuels.

### Political Latitude Curtailed

Keystone XL pipeline was an unprecedented denial of a major fossil project based on its carbon footprint.

### Legal Scrutiny

ExxonMobil investigation taking shape of tobacco industry path.

### Constrained Financial Resources

G20 joins multilateral banks in ending support for new coal-fired power plants.

### Social Stigma

Divestment movement gaining traction.

### Escalating Regulations

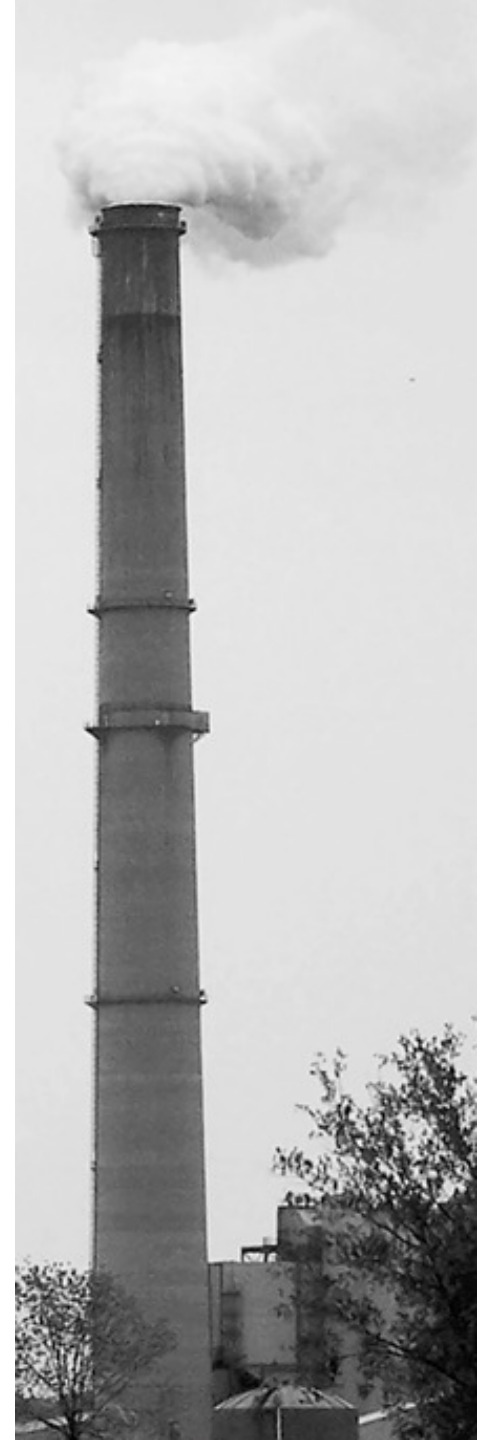
EPA and other state and local initiatives trending toward clean energy future.

### Investment Risks

Notion of stranded assets and the “carbon bubble” reaching the financial community.

### Global Agreement to Reduce Emissions

Plan to move from fossil fuels to clean energy adopted worldwide



## Reality check

### Calling the game

Society is moving past fossil fuels  
You are losing market share  
Stop fighting progress  
Do the right thing





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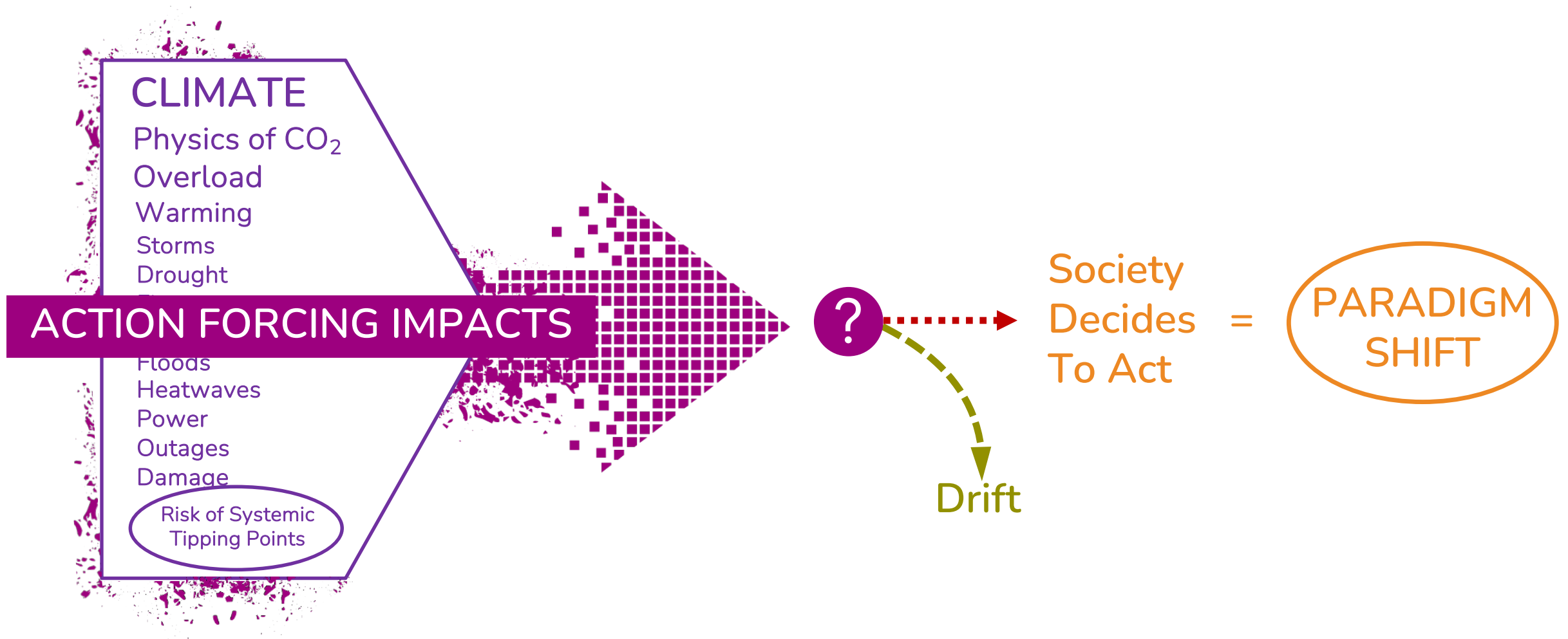


## The Goal

Bend the curves

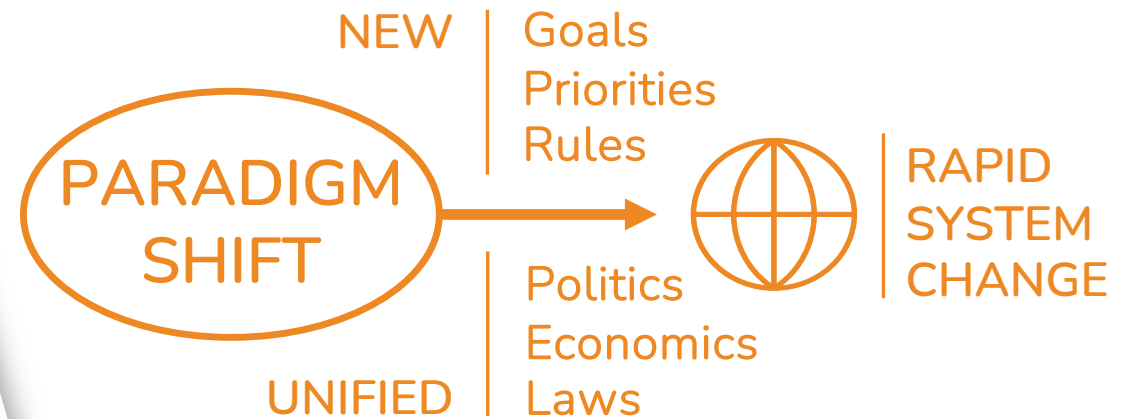
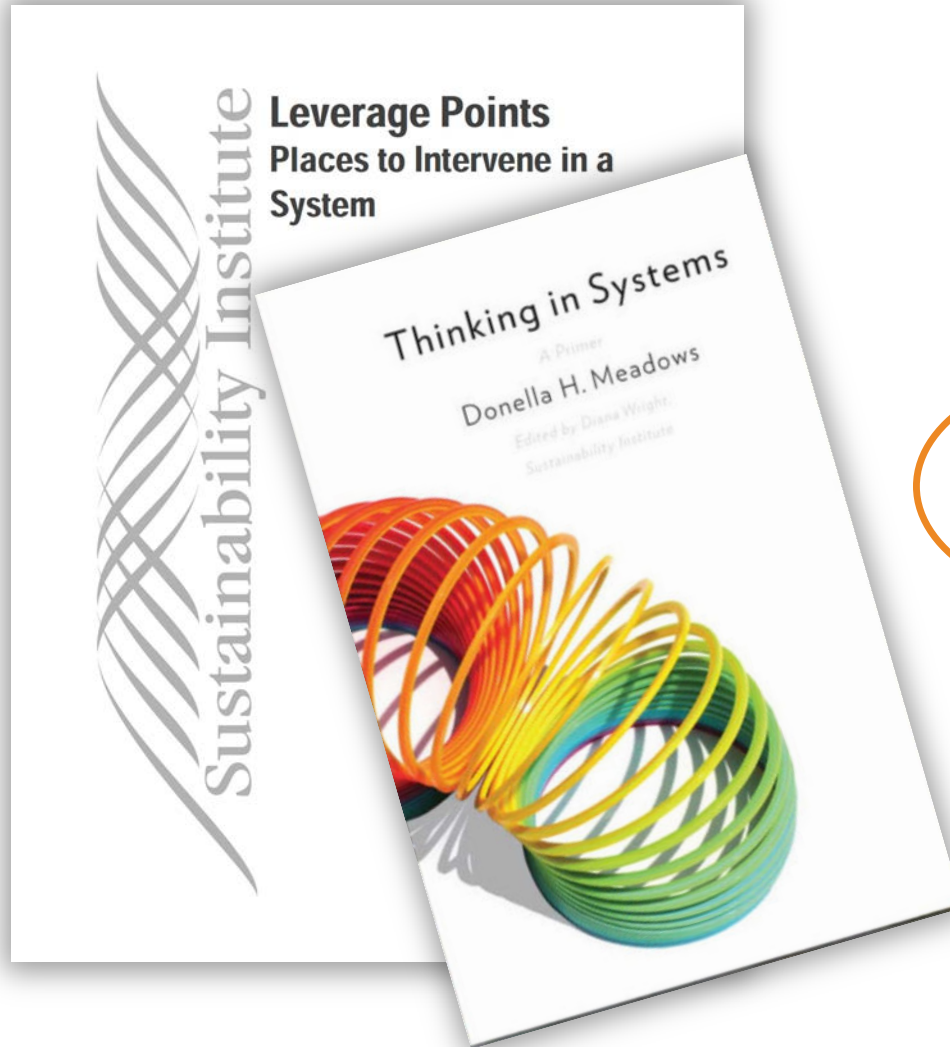
# The Daily Question

Climate is an escalating global risk



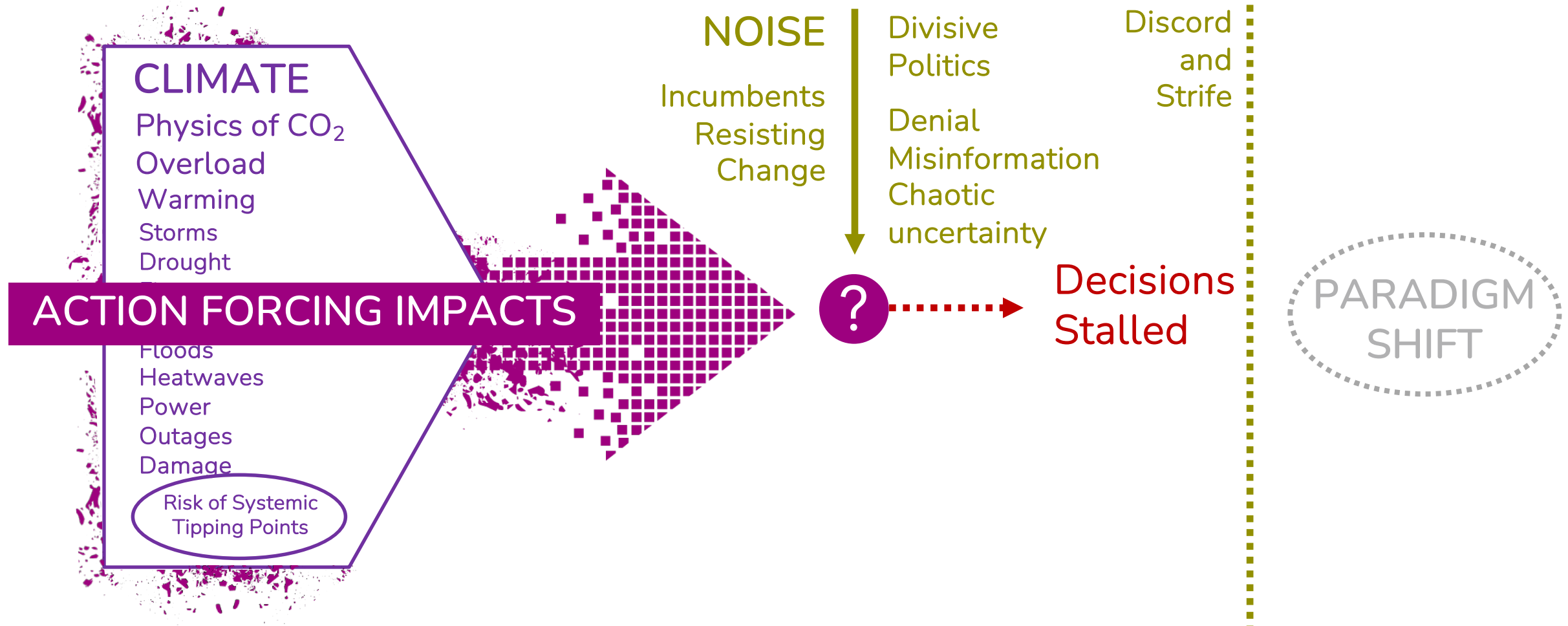
## Systems Thinking

A paradigm shift is the best leverage point to change a system



# Predatory Delay

## Active measures to forestall decline



# Discouraging Phrases, Repeated Often

## A diet of bread and water

### The Old Script

WE ARE DEPENDENT

PROBLEM IS TOO BIG

FUTURE IS GRIM

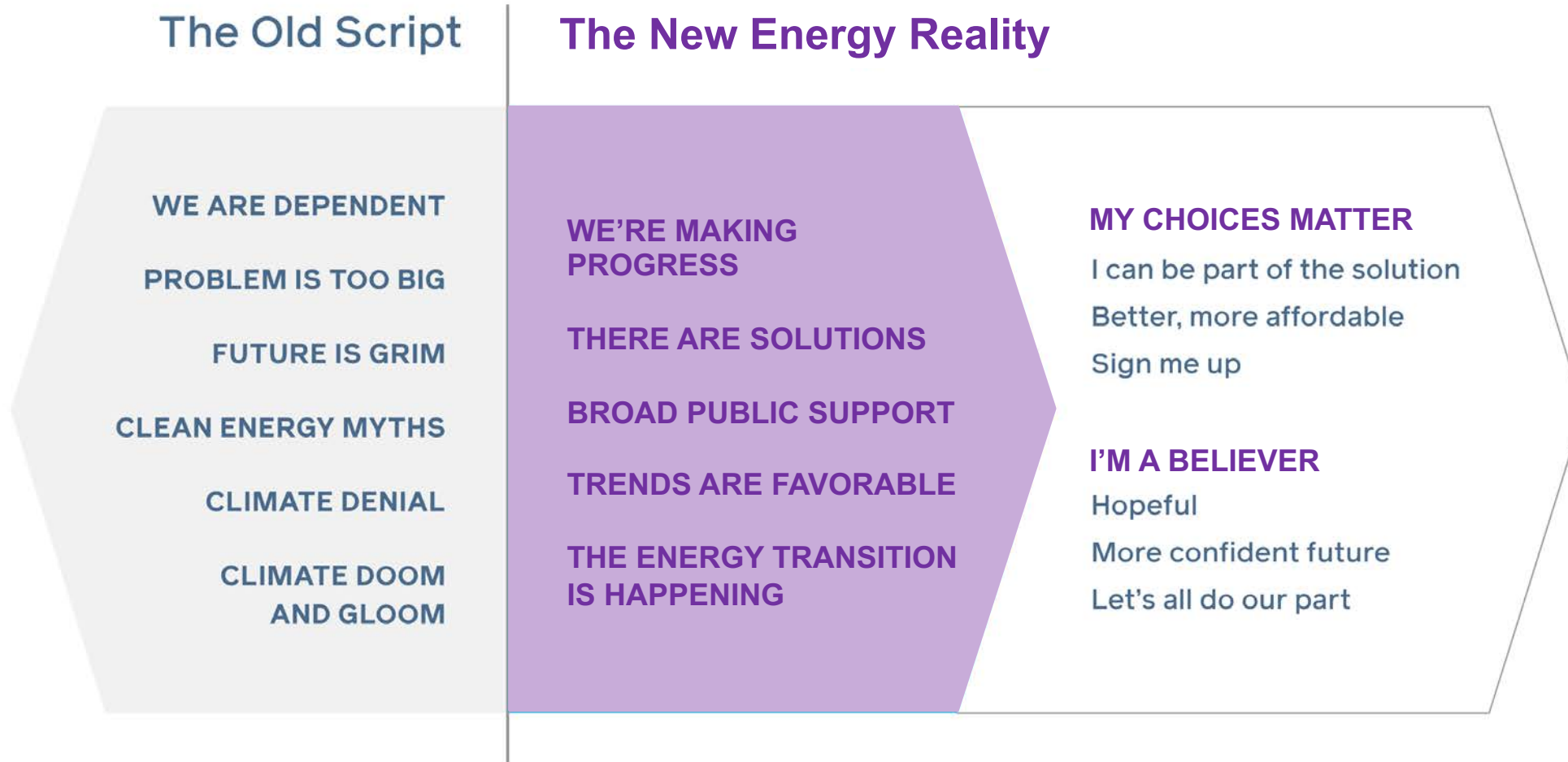
CLEAN ENERGY MYTHS

CLIMATE DENIAL

CLIMATE DOOM  
AND GLOOM

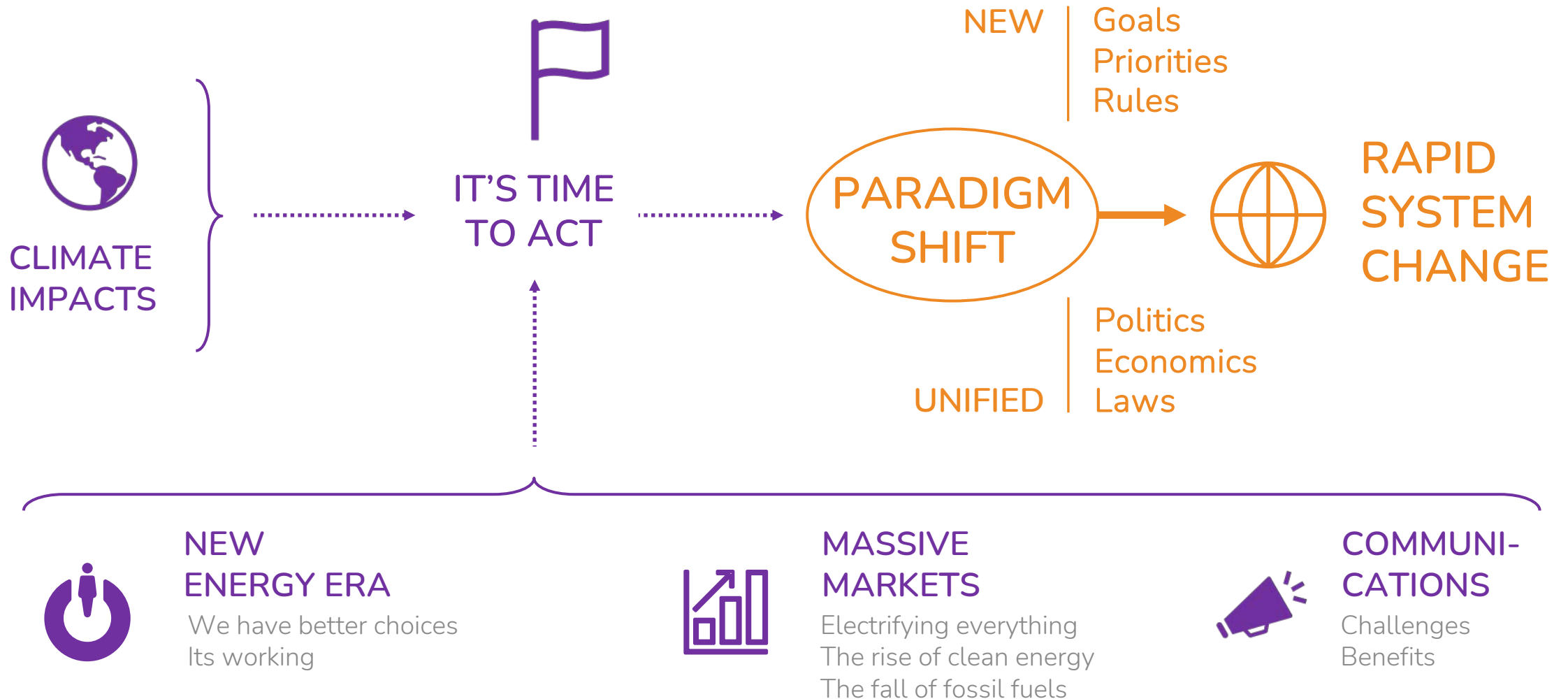
# The New Reality

## Momentum is contagious



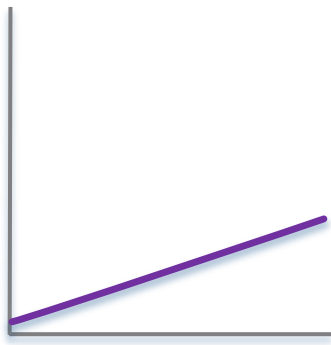
# The Tipping Point

Change happens slowly... then all at once



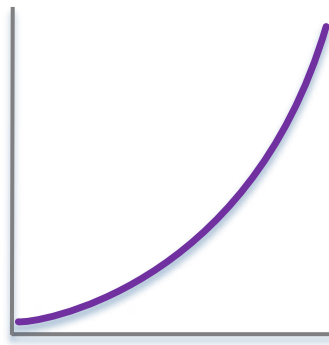
## The Growth Path Forward

What does a cultural shift look like?



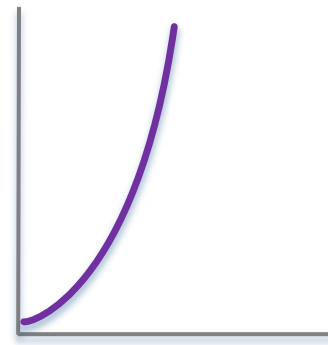
LINEAR

NEW TOOTHBRUSH



EXPONENTIAL

CELL PHONES

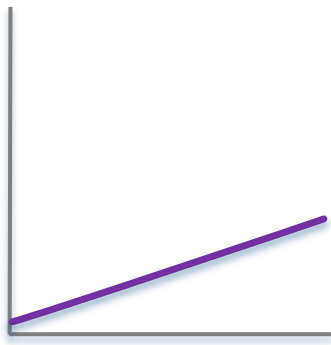


VIRAL

DIGITAL VIDEOS

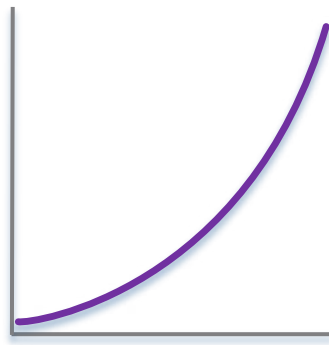
## An Idea Whose Time Has Come

Ideas can crystallize across society and result in durable change



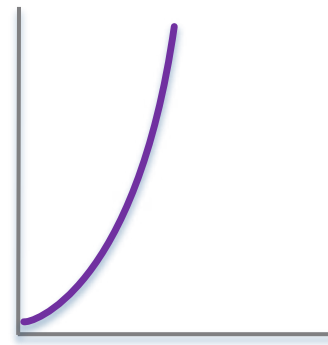
LINEAR

NEW TOOTHBRUSH



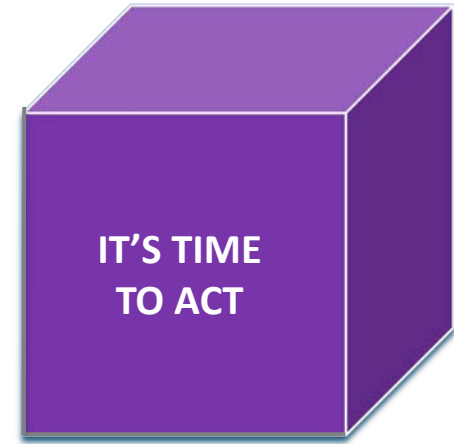
EXPONENTIAL

CELL PHONES



VIRAL

DIGITAL VIDEOS



CRYSTALLIZATION

SOCIAL NORMS

*"You can resist an invading army, but you cannot resist an idea whose time has come."*

*-Victor Hugo*



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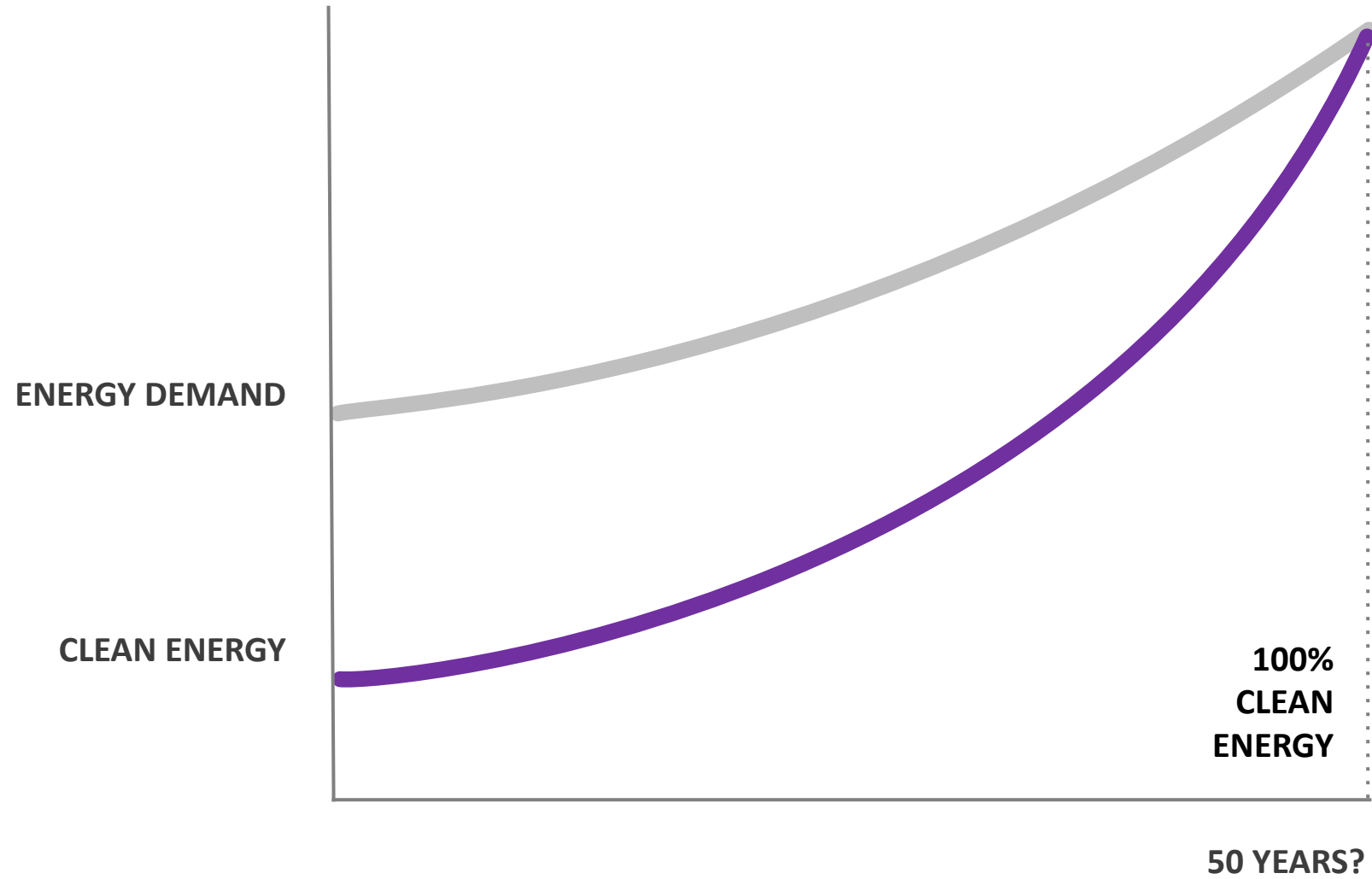


## The Goal

Bend the curves

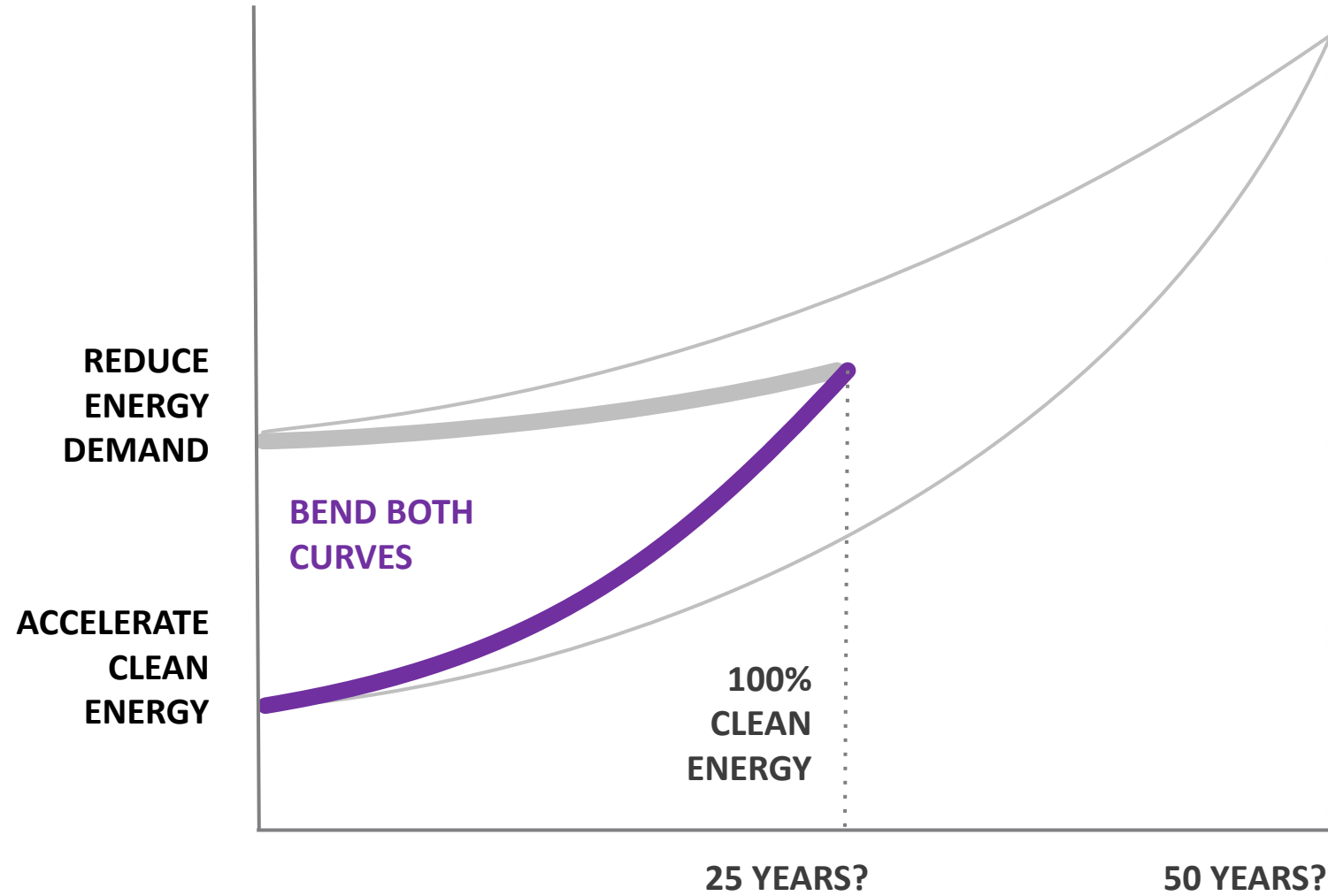
## The Mission

100% clean energy



# The Goal

Get there sooner



# ENERGY AWARE SOCIETY

Aligned  
Mobilized  
Determined



## SOCIAL

Social norms  
Social activism  
Social networks



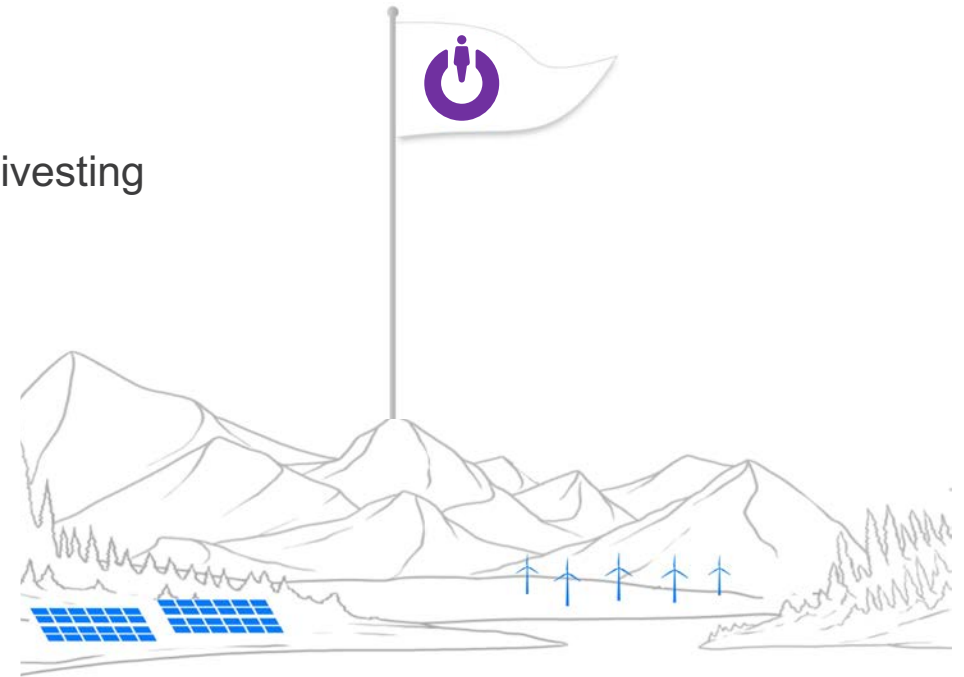
## ECONOMIC

Purchasing  
Investing / Divesting  
Occupation



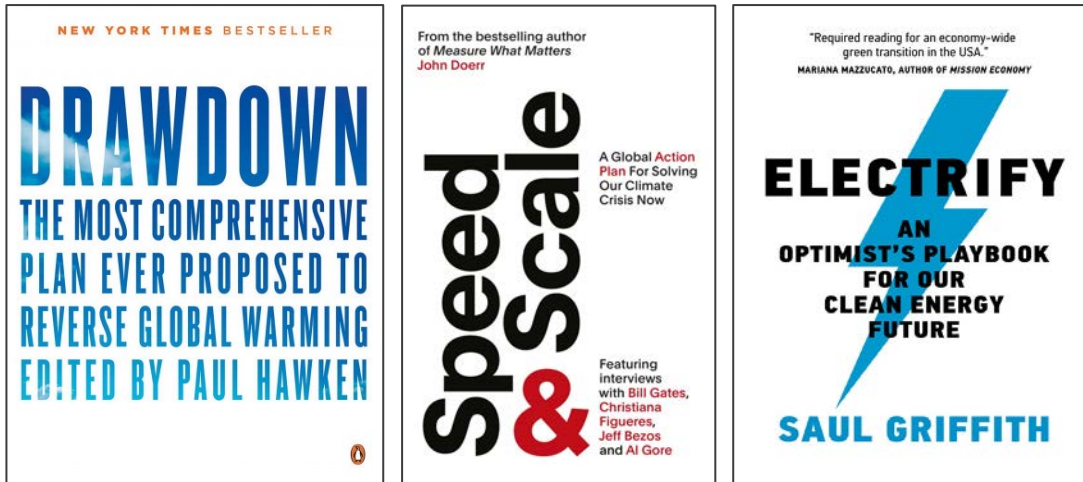
## POLITICAL & LEGAL

Voting  
Politics  
Laws and  
regulations



# Resources

## Read



## Connect

Follow us on Instagram: @generation180  
Twitter: @Gen\_180

## Listen



