

Stories We Tell



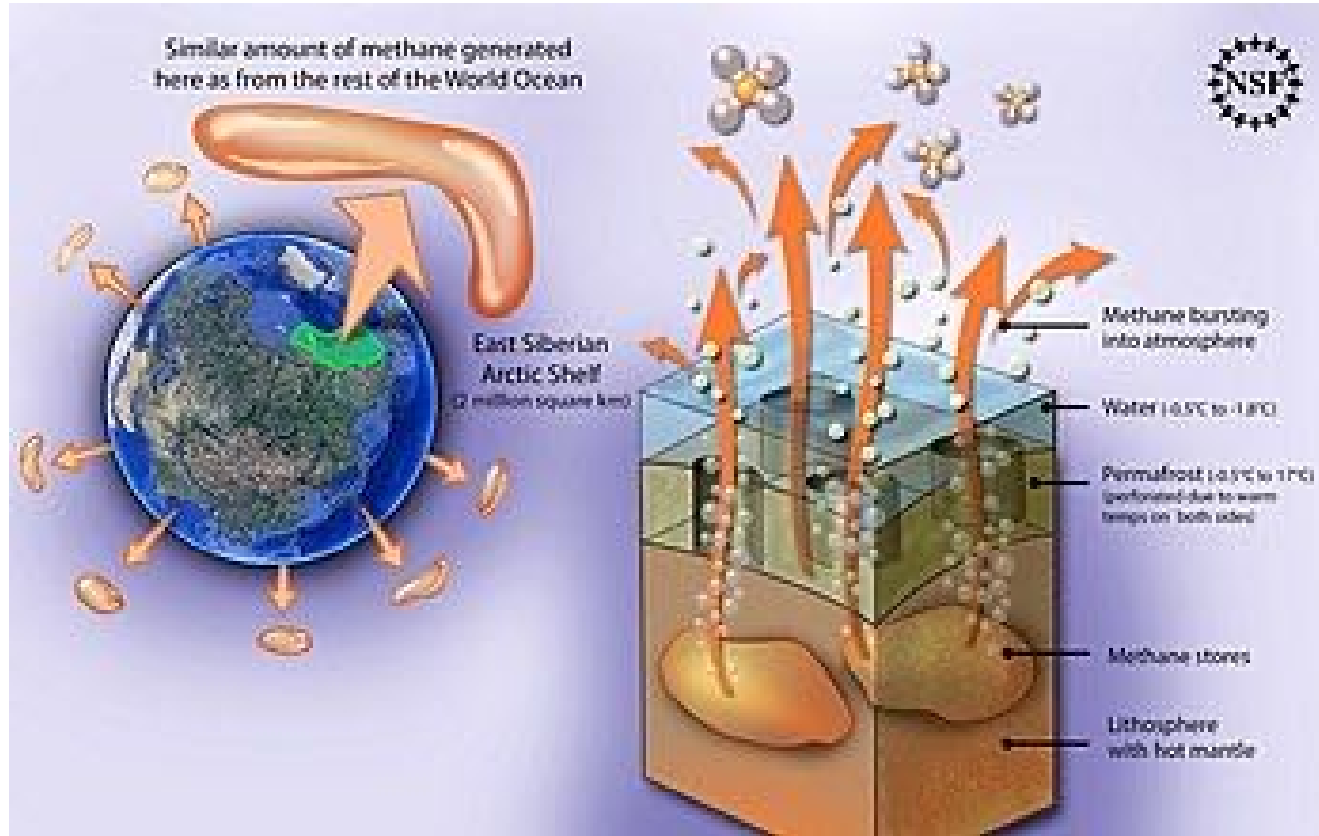
Runaway Feedback?

- Positive feedback does NOT imply “runaway feedback”
- Even though positive feedback dominates the climate system, it **has NEVER “run away”** to an unsurvivable state even though Earth has had HUGE forcing before



Venus is Uninhabitable

Scary Positive Feedbacks



- Amazon dieback
- Permafrost thaw
- Methane clathrates
- Evaporate the oceans

SO FAR NO EVIDENCE THAT ANY OF THESE WILL RUN AWAY, EITHER FROM PHYSICS OR PALEOCLIMATE

Thelma and Louise





A collage image featuring a cigarette, a road sign, and a detour sign. The cigarette is lit and smoking, with a blue semi-transparent box overlaid on it containing red text. The background shows a road with a white line, grass, and a road sign that reads 'BRIDGE OUT' and 'TRAFFIC ONLY'. Below the sign is a black sign with a red arrow pointing right and the word 'DETOUR' in white.

Them
things'll
kill ya

BRIDGE OUT
MILES AHEAD
TRAFFIC ONLY

DETOUR

IPCC 1.5 Degree Report

Two Primary Messages

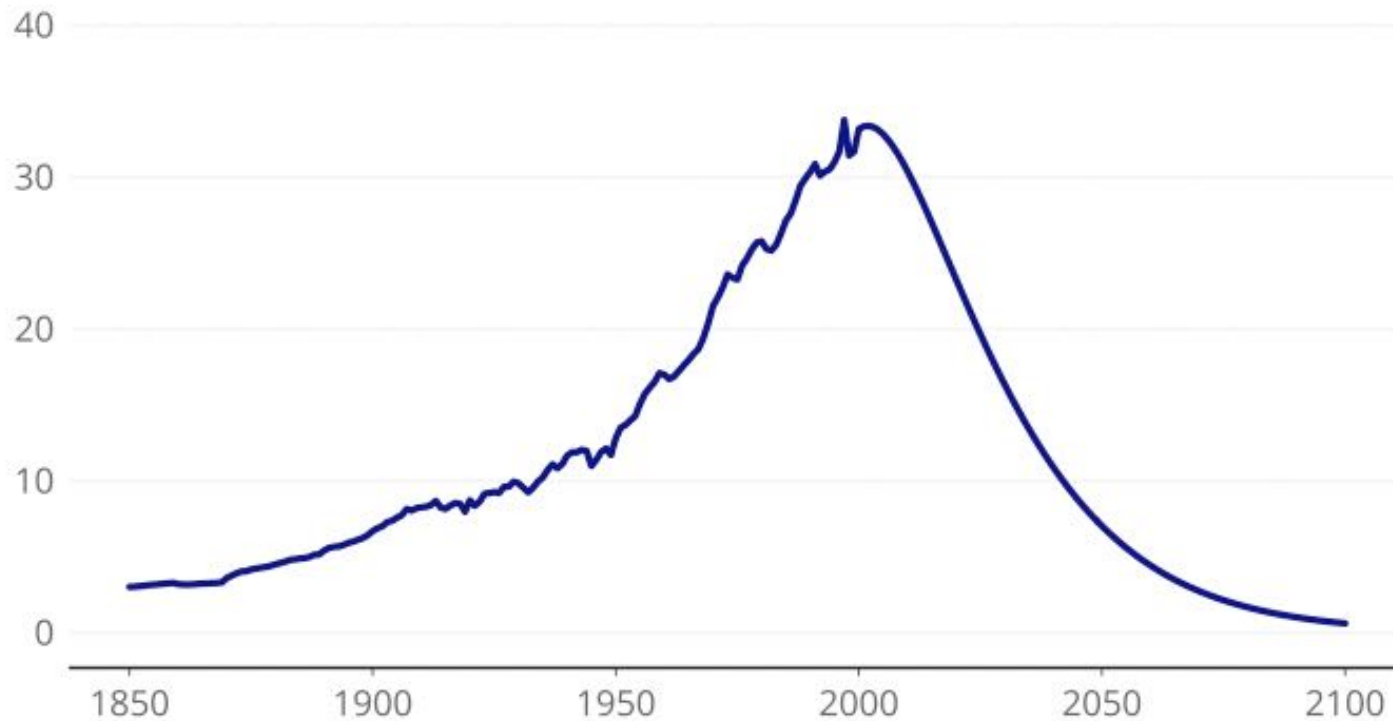
- 1) Warming of **2 C** is **considerably worse** than warming of 1.5 C
- 2) Limiting warming to 1.5 C will be **REALLY HARD** – **Start right away!**



Flattening the Curve

Flattening the climate curve

Carbon dioxide emissions, in gigatons, required to limit warming to 1.5°C, if climate action were taken in 2000



Data source: R. Andrew / Global Carbon Project
Mitigation trajectories assume a 66-percent chance of averting 1.5°C of warming.



Is Climate Binary?

We might imagine that **all is well** until



... warming creeps up on us

... and then suddenly

... **we cross a BRIGHT LINE**

... beyond which lies **utter catastrophe**

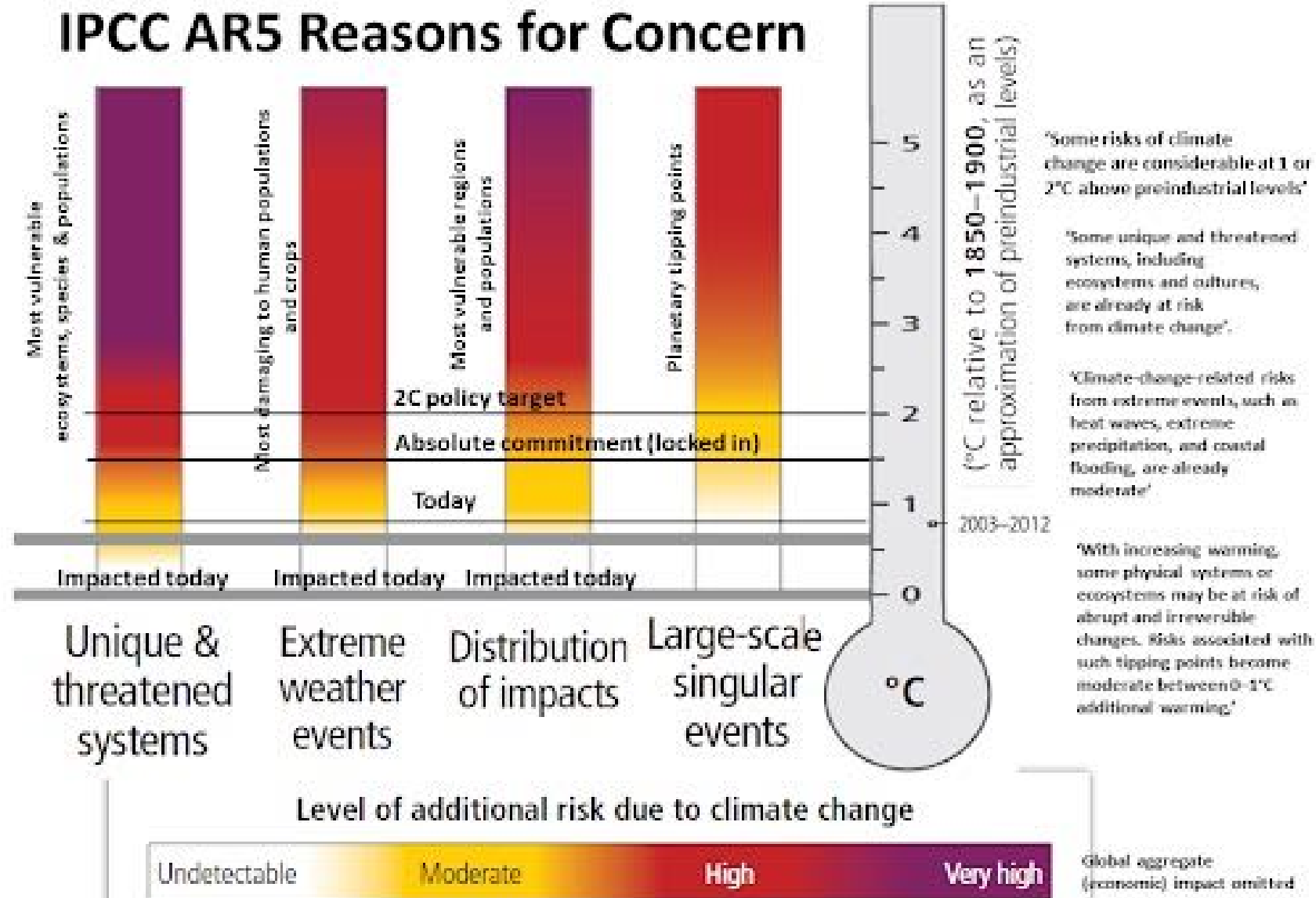
NO.

Climate is NONBINARY

- It's important to have goals, & policy requires targets ...
- but the real climate changes gradually from cool to warm to hot, with an *infinite gradient from bad to worse*.
- *This sucks, psychologically and spiritually!*
- We have to live our lives and do the work to build a *complicated ambiguous future*

A Nonbinary Continuum

- Already bad!
- Getting worse
- There's no end to how much worse it can get!
- Then it won't get better!



Policy Thresholds

Policy and politics is about setting goals and limits

- 1992 Rio de Janeiro Earth Summit
“Avoid dangerous human interference in the climate system”
- 2015 Paris Agreement
“Limit warming to well below 2 Celsius above preindustrial conditions & strive for 1.5 C”

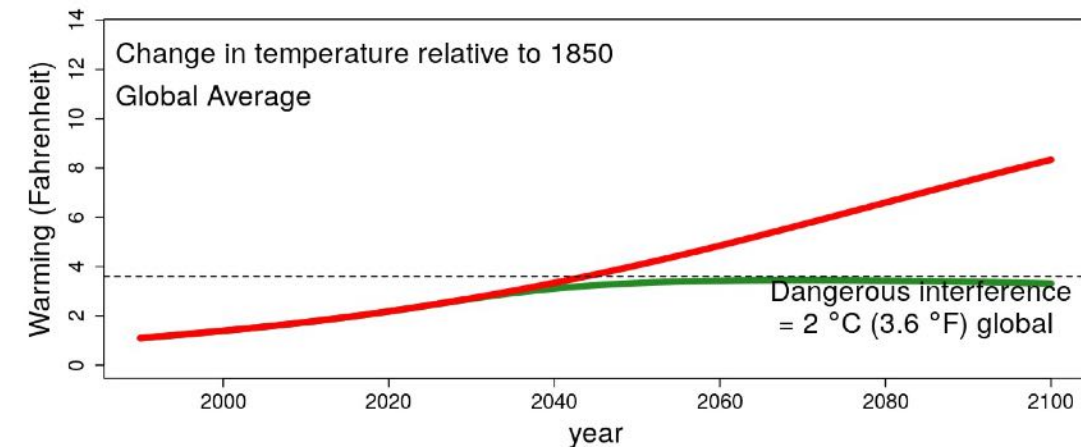
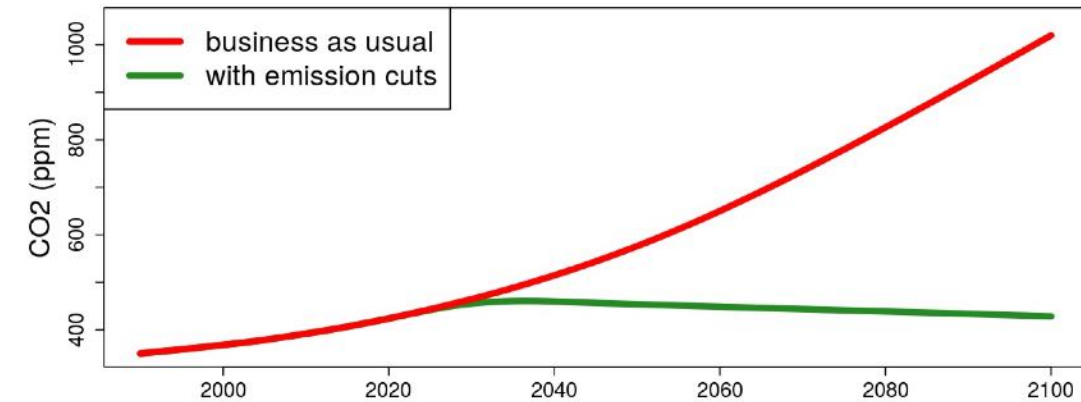
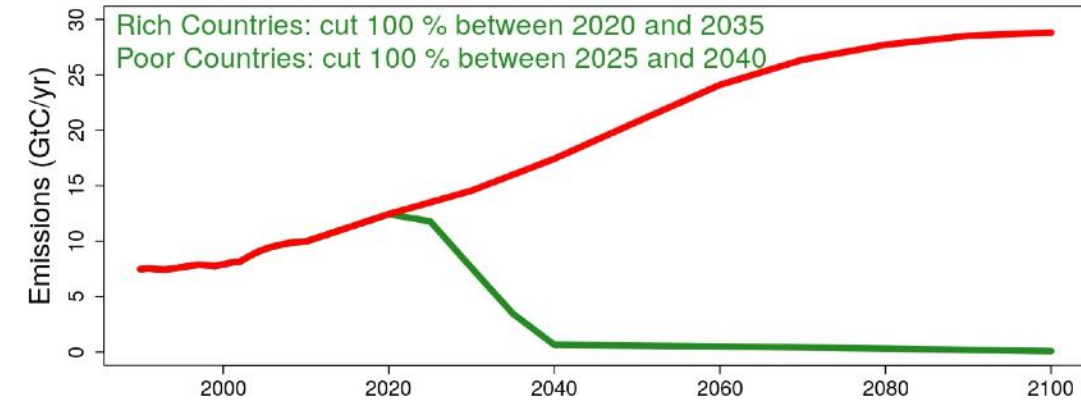




What if we Win?

- CO₂ emissions to zero by 2040
- CO₂ concentration stabilizes
- Climate inertia
- Social inertia
- Economic inertia
- **WARMING STOPS AROUND THE TIME EMISSIONS GET TO ZERO!**

Effects of Emissions Reductions:



Ambiguity!

What if we're wrong about
Sensitivity or feedbacks?

- Carbon sinks have sucked up ~ 50% of emissions as long as we've been able to measure them
- When emissions cease and CO₂ stops rising, what happens to sinks?
- Will they fight us on the way down as they helped us on the way up?

The Impossible Hamster



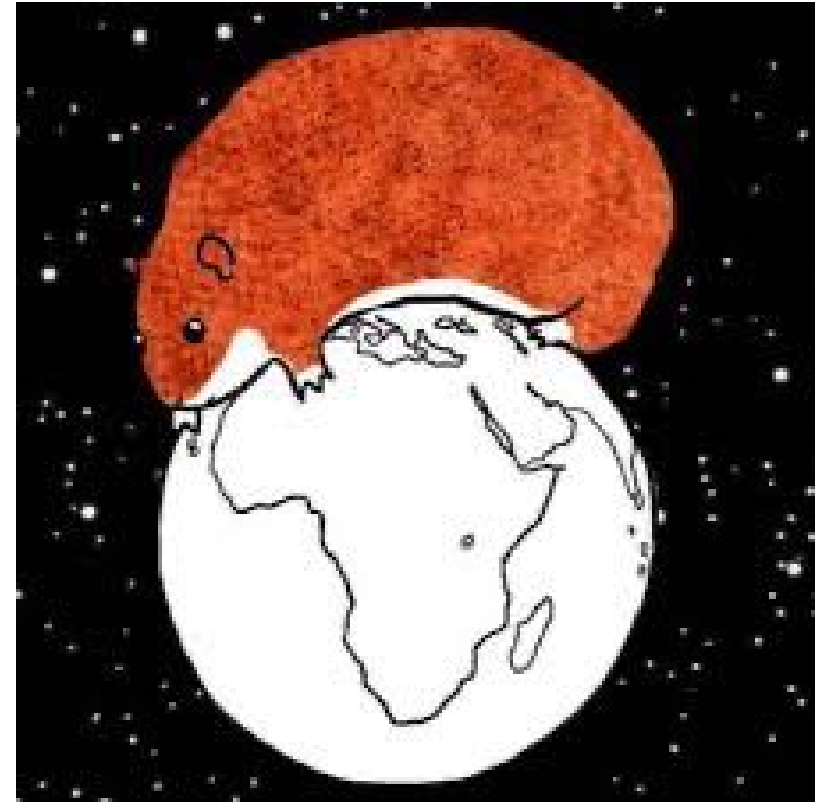
(doubles in size each week)



birth

First Things First

- The Impossible Hamster will have to be *tamed*
- That will be hard, & *may take awhile*
- In the meantime, we have an *emergency!*

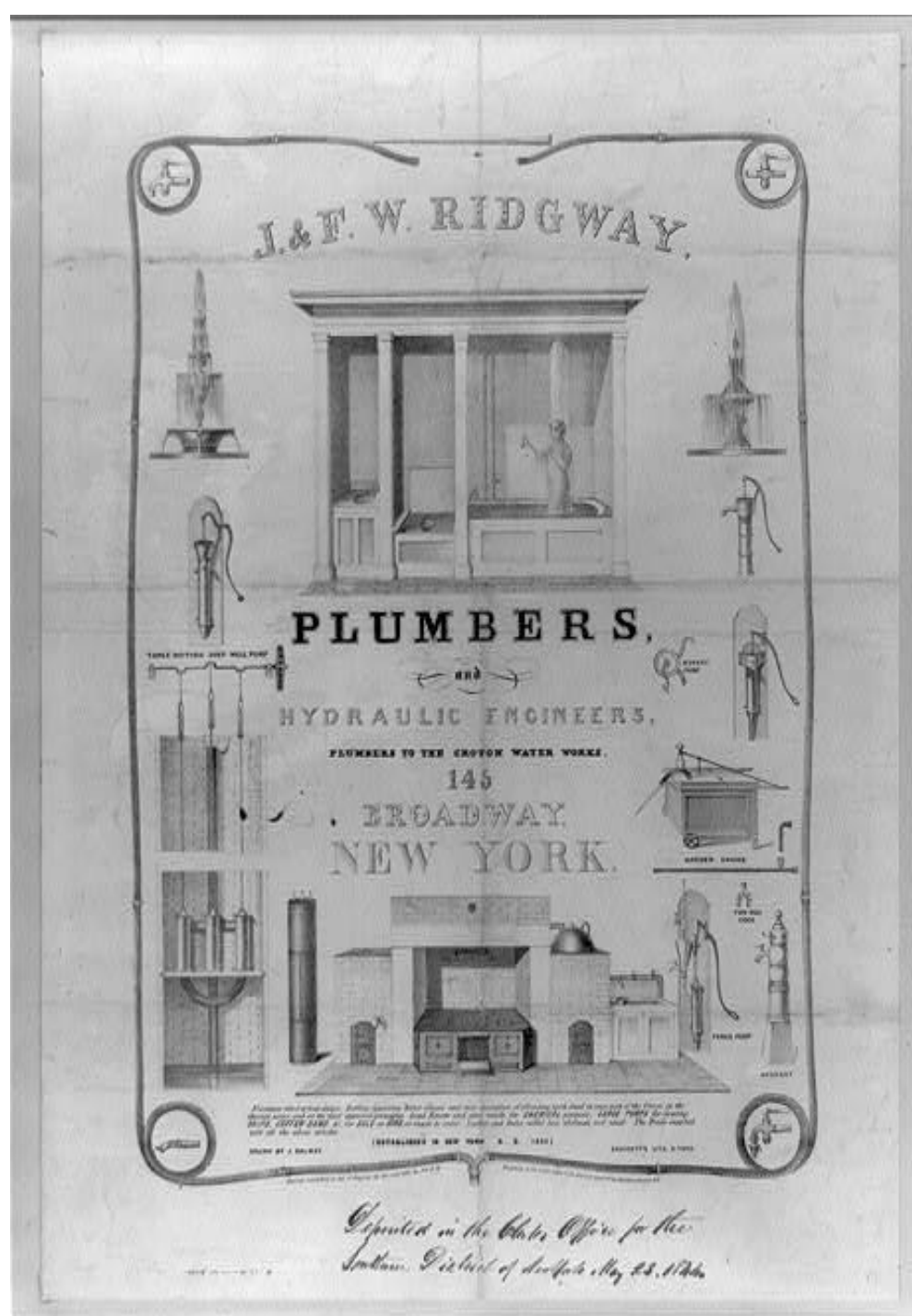


A close-up photograph of Elon Musk, looking slightly to his left with a serious expression. He is wearing a black tuxedo jacket over a white shirt with a large, ruffled bow tie. The background is blurred, showing greenery and other people in formal attire.

Too expensive?

Costs

- Conversion to 100% noncarbon energy will cost about **1% of GDP**
- That's about **what it cost to retrofit all the world's cities with indoor plumbing a century ago ...**
- It was **SO** worth it!



*Deposited in the State Office for the
London. District of Middlesex May 24, 1876*

Costs in Context

Item	Cost
1% of global GDP	\$1 trillion / year
Phones & communication services	\$1.5 trillion / year
New automobiles (90 million/year @ \$25,000)	\$3 trillion / year
Coal, Oil, and Gas	\$4 trillion / year
Information technology	\$4 trillion / year
Roads (64 million miles @ \$5M/mile)	\$ 320 <i>trillion</i> total

Saving humanity will cost a lot of money.

- Less than we spend on **our phone bills**
- ***Vastly less*** than we spent on computers or roads!

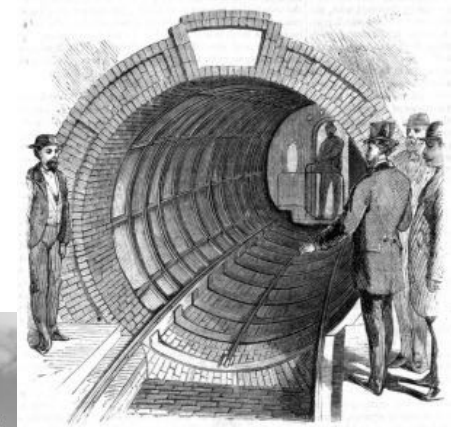
Direct Tax-Funded Government Subsidy: More than \$300 TRILLION



My Grandparents

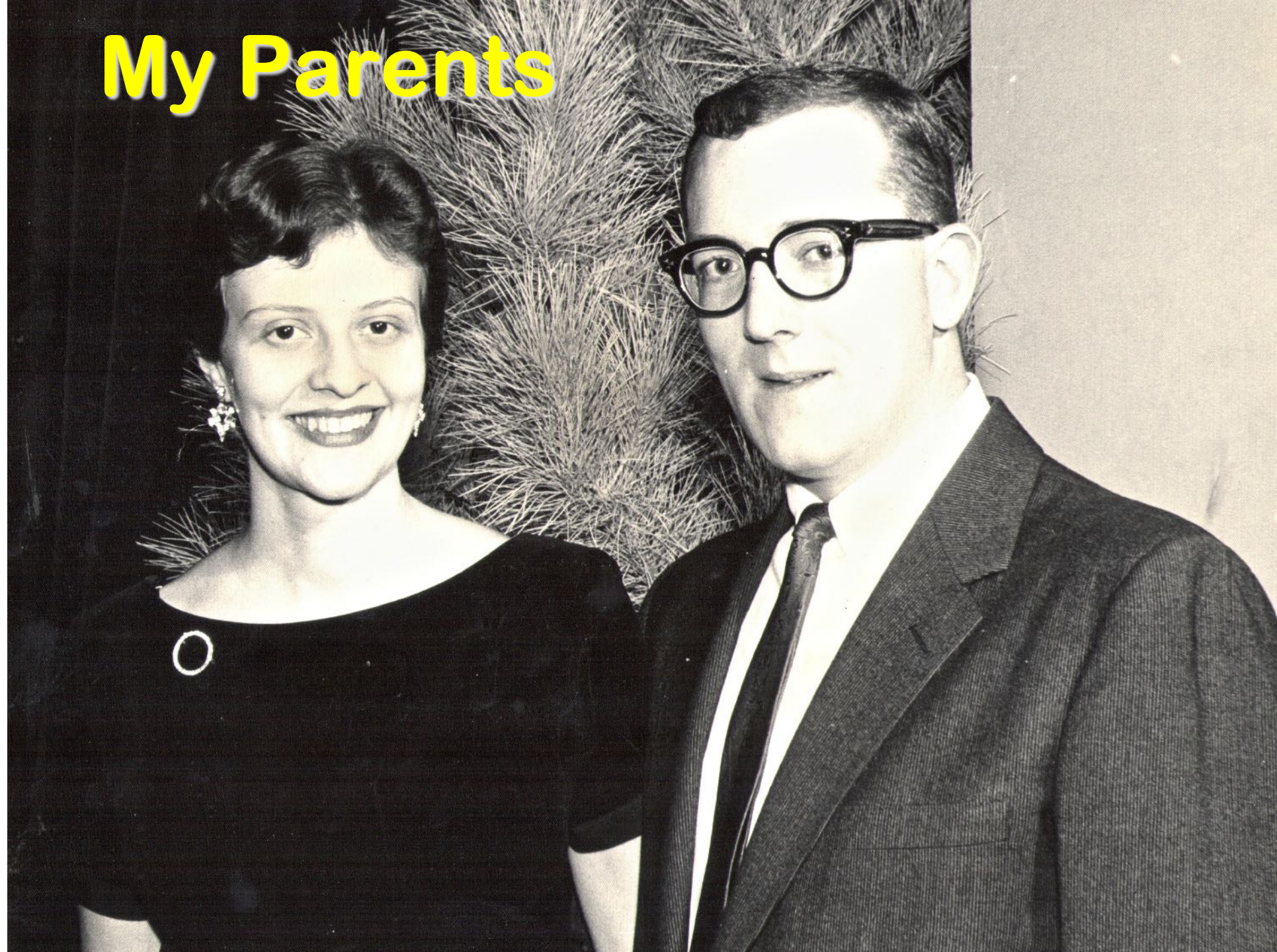


My Grandparents' Generation



**Built subways, sewers,
the electrical grid, defeated the Nazis**

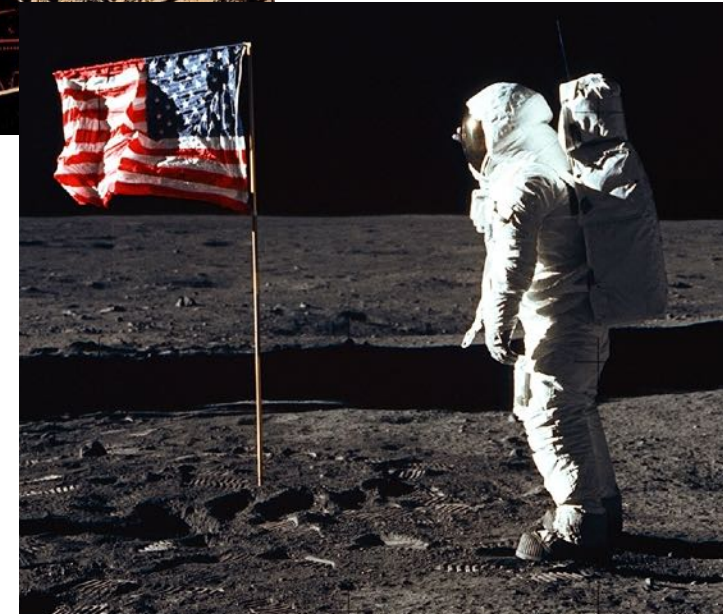
My Parents



My Parents' Generation



Ribbon-cutting ceremony along the first portion of Interstate highway to be completed in Wisconsin on September 4, 1958—I-94 in the Waukesha area. (Photo courtesy Wisconsin Historical Society Archives.)



**Built the Interstate Highways,
fought the cold war, landed on the Moon!**

Jennifer & Me





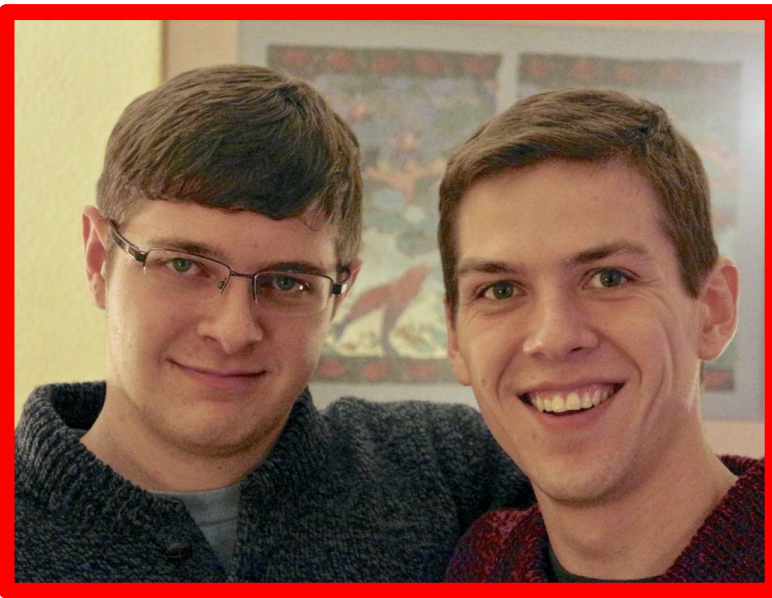
My Generation



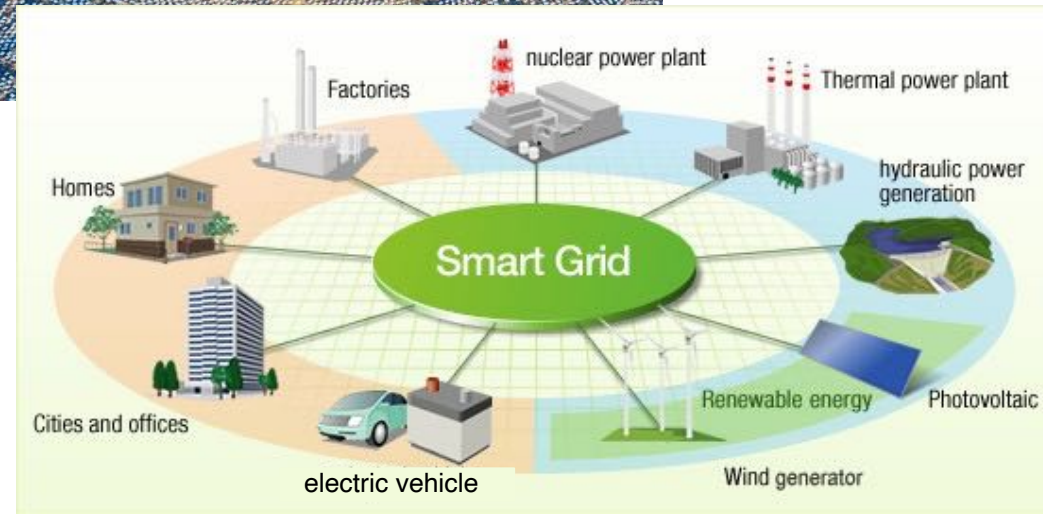
**Invented the PC, Built the internet,
replaced billions of land-lines with cell phones**

My Kids





My Kids' Generation



Will replace the world's energy system *again!*

Fast Transformation!

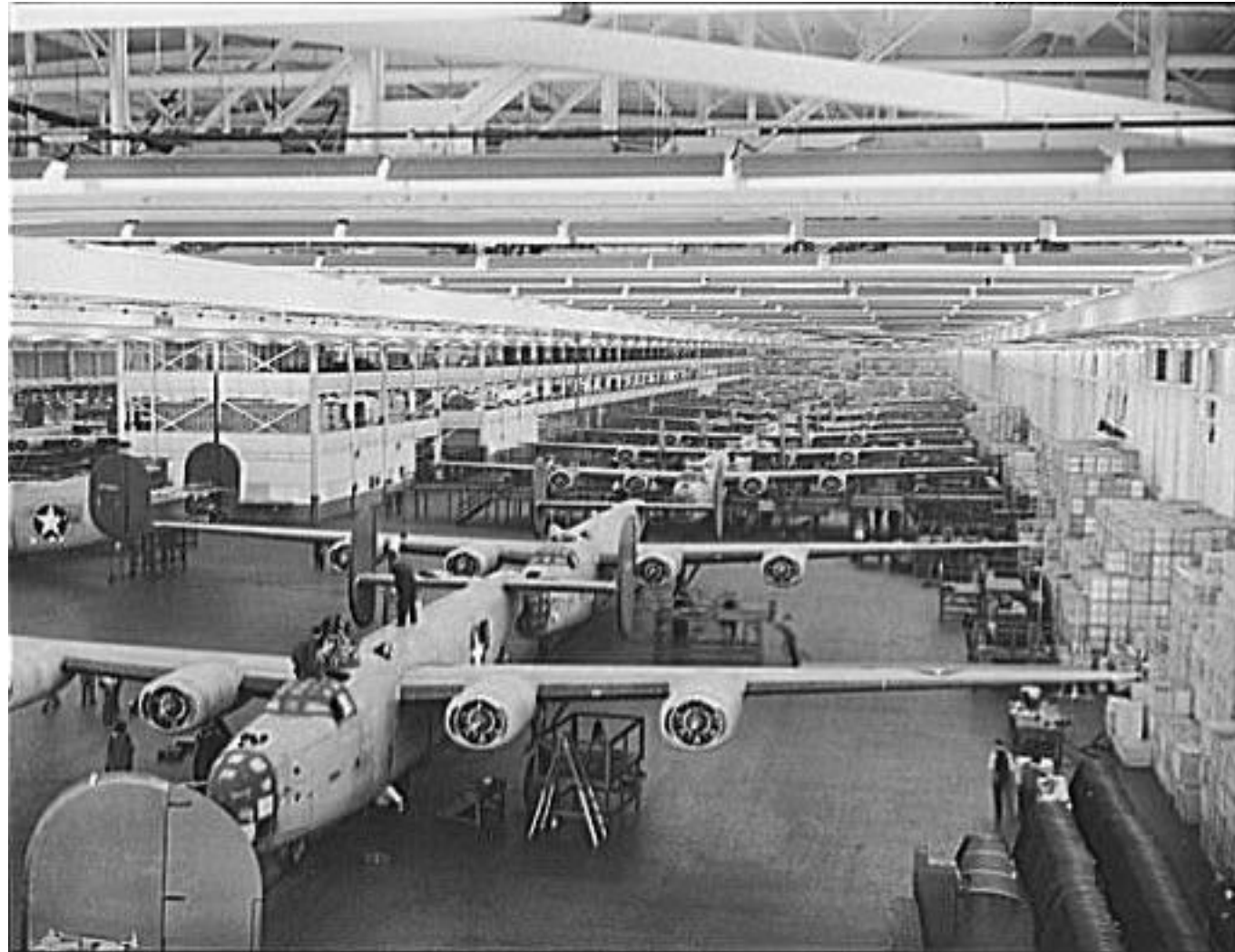


1900



1913

5th Avenue, New York City



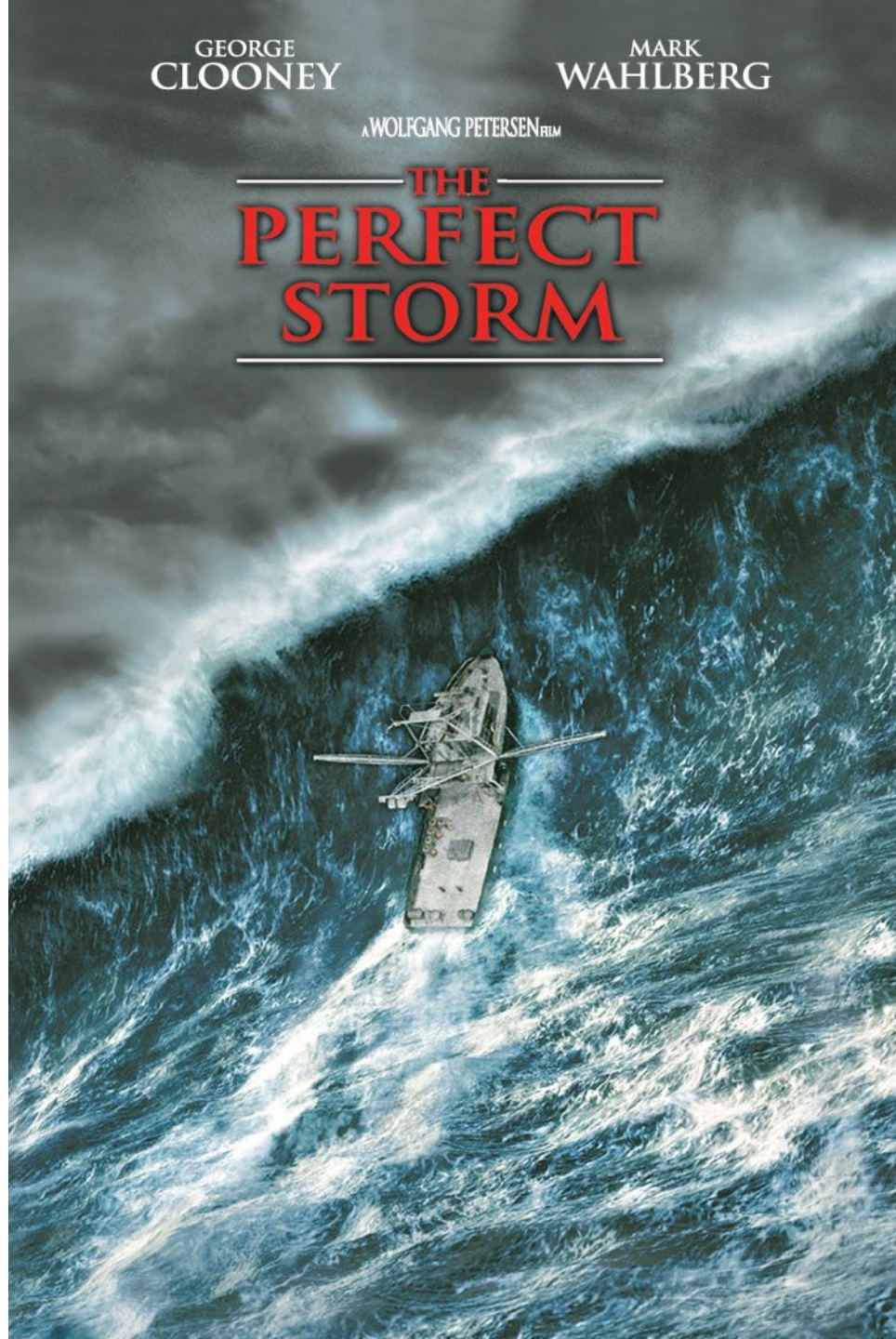
1944: **Ford Motor Company** Willow Run, MI plant produced one B-24 bomber every 63 minutes, 24 hours/day, 7 days/week

GEORGE
CLOONEY

MARK
WAHLBERG

A WOLFGANG PETERSEN FILM

— THE —
**THE
PERFECT
STORM**
—



A PERFECT
MORAL STORM
THE ETHICAL
TRAGEDY
OF CLIMATE
CHANGE

STEPHEN M. GARDINER

Perfect Moral Storm

1. The Global Storm

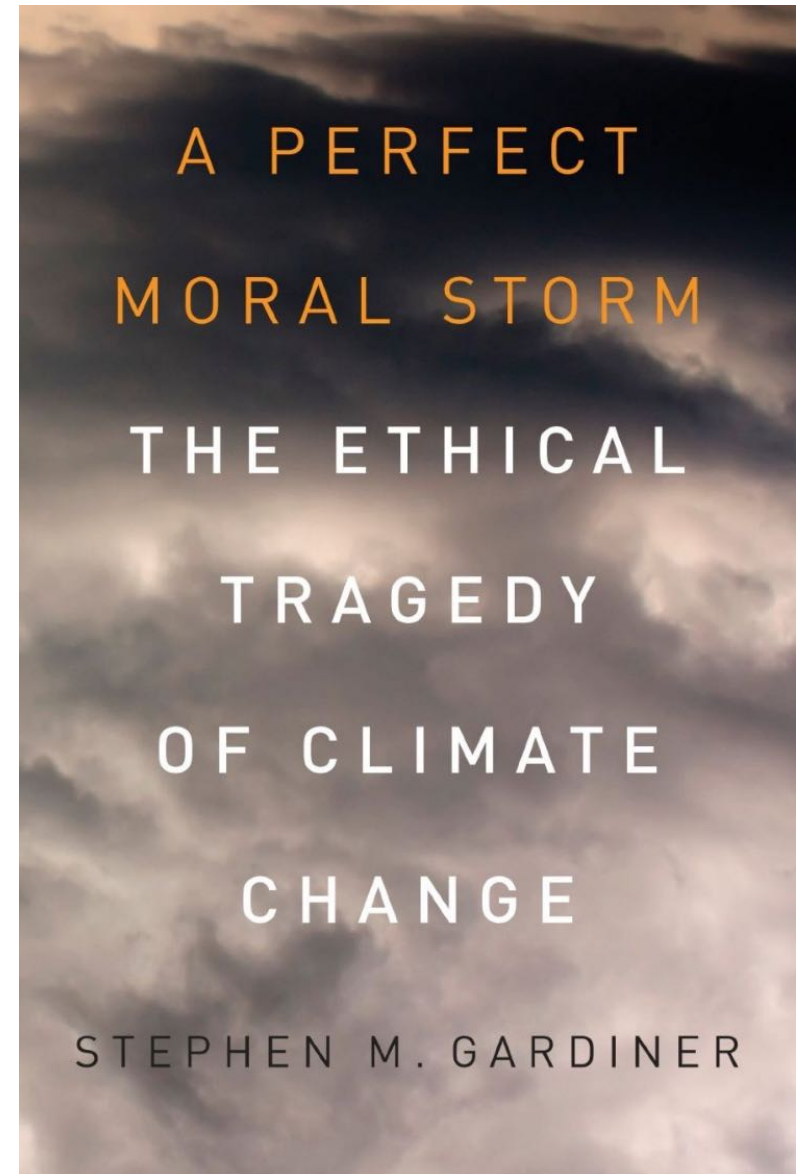
- Dispersion of causes and effects
- Fragmentation of agency
- Institutional inadequacy

2. Intergenerational Storm

- Time is not our friend
- Perpetual consequences

3. Moral Corruption

- Distraction & complacency
- Delusion and Doubt
- Inward obsession



Perfect Moral Storm

1. The Global Storm

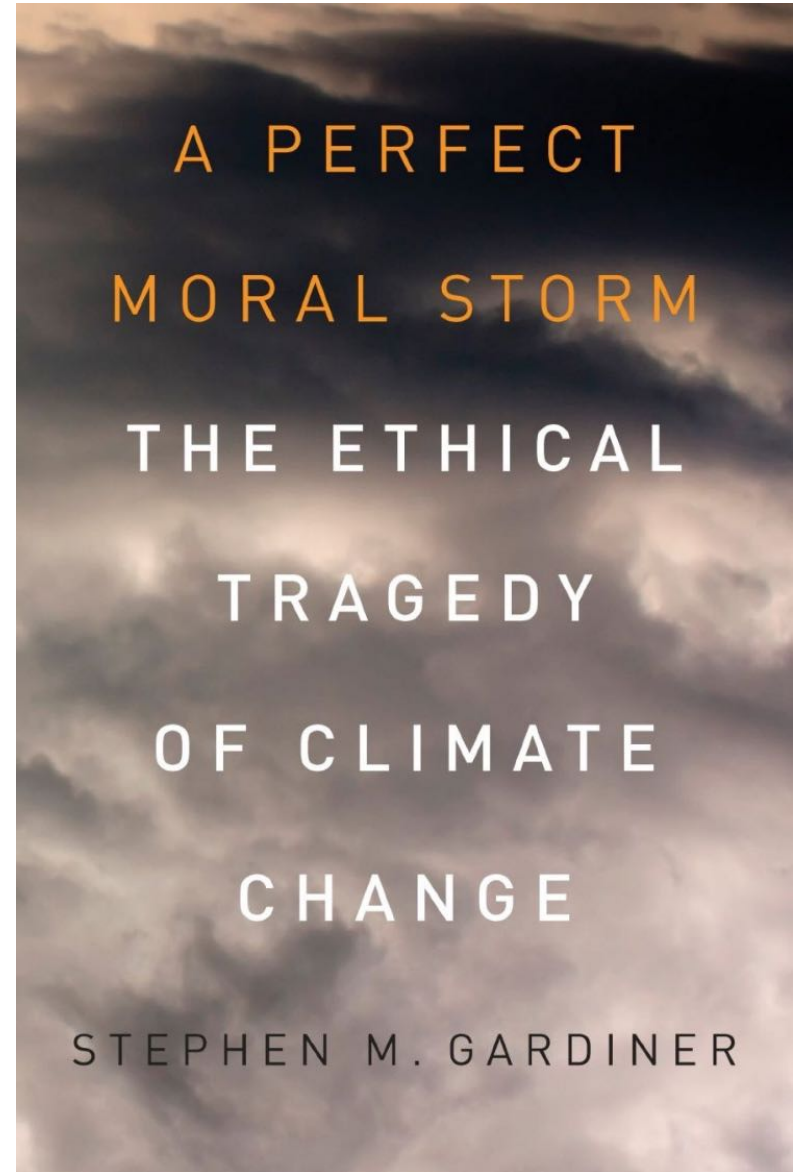
- Division of causes from effects
- Fragmentation of agency
- Institutional inadequacy

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3. Moral Corruption

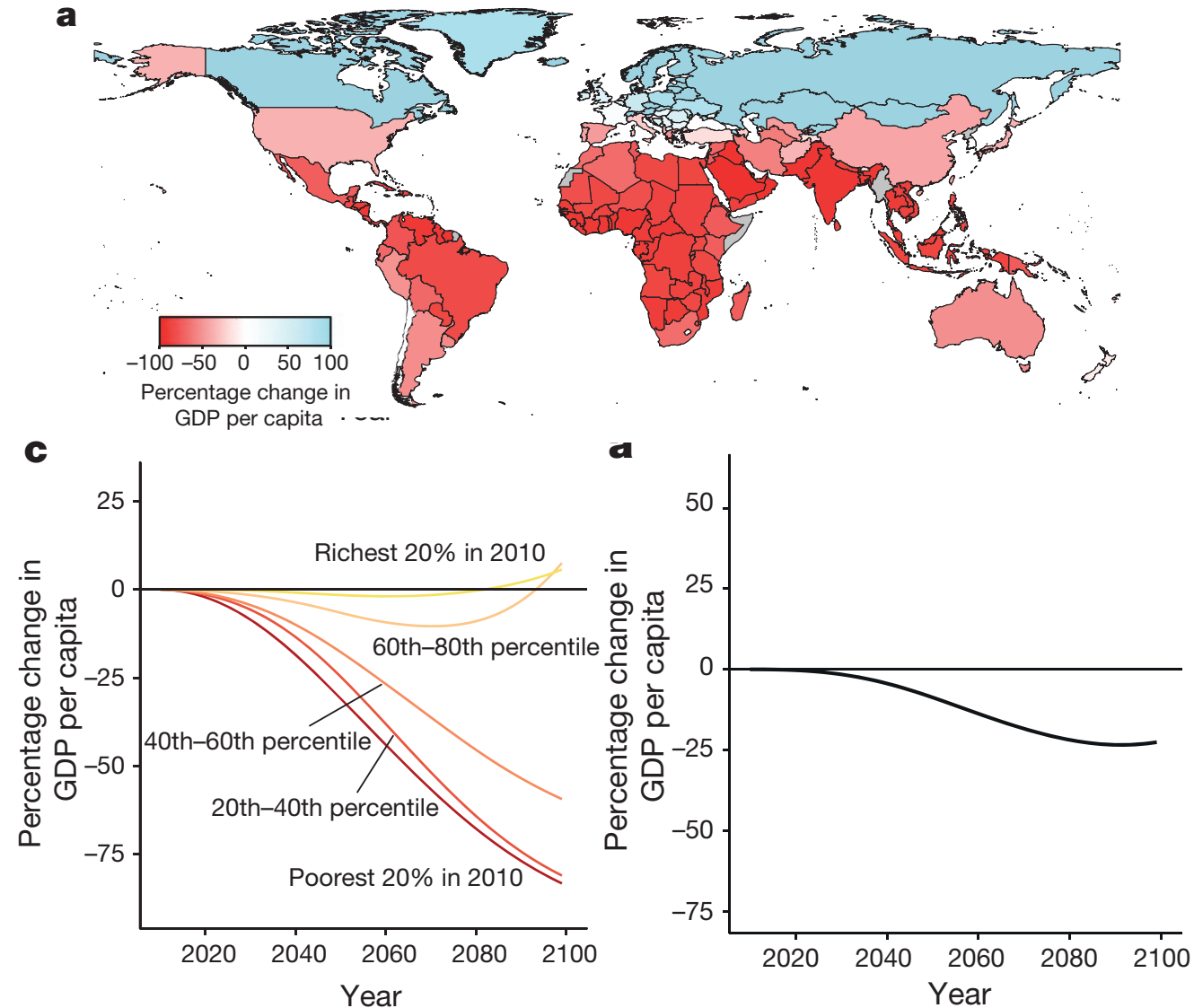
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Unequal!

- Global warming **harms** those most who benefit least
- Not just “the environment” but especially **poverty, war, brutality, and displacement**
- **Economic collapse 80% for bottom half of countries**

RESEARCH LETTER



Burke et al (2015)

Perfect Moral Storm

1. The Global Storm

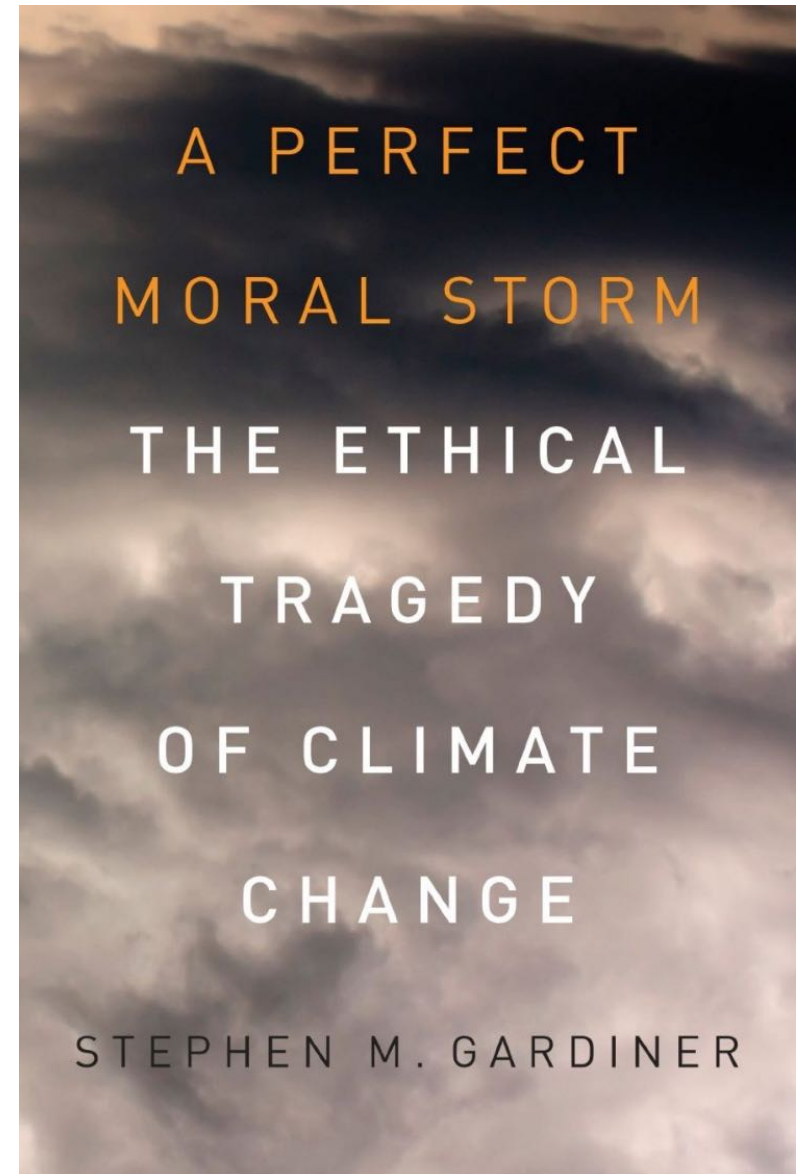
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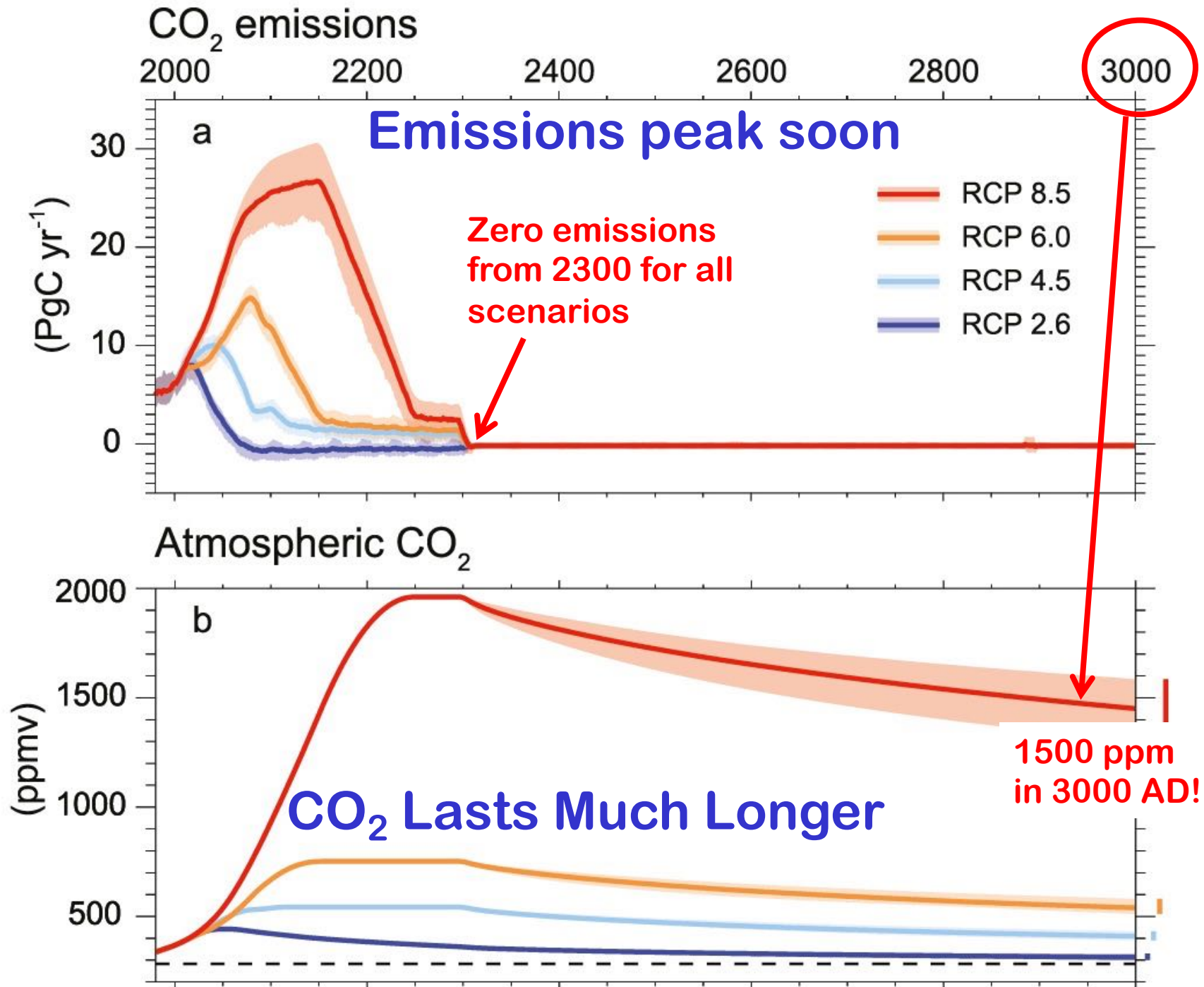
2. Intergenerational Storm

- **Consequences forever**
- **Harm to trillions of people!**

3. Moral Corruption

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Perfect Moral Storm

1. The Global Storm

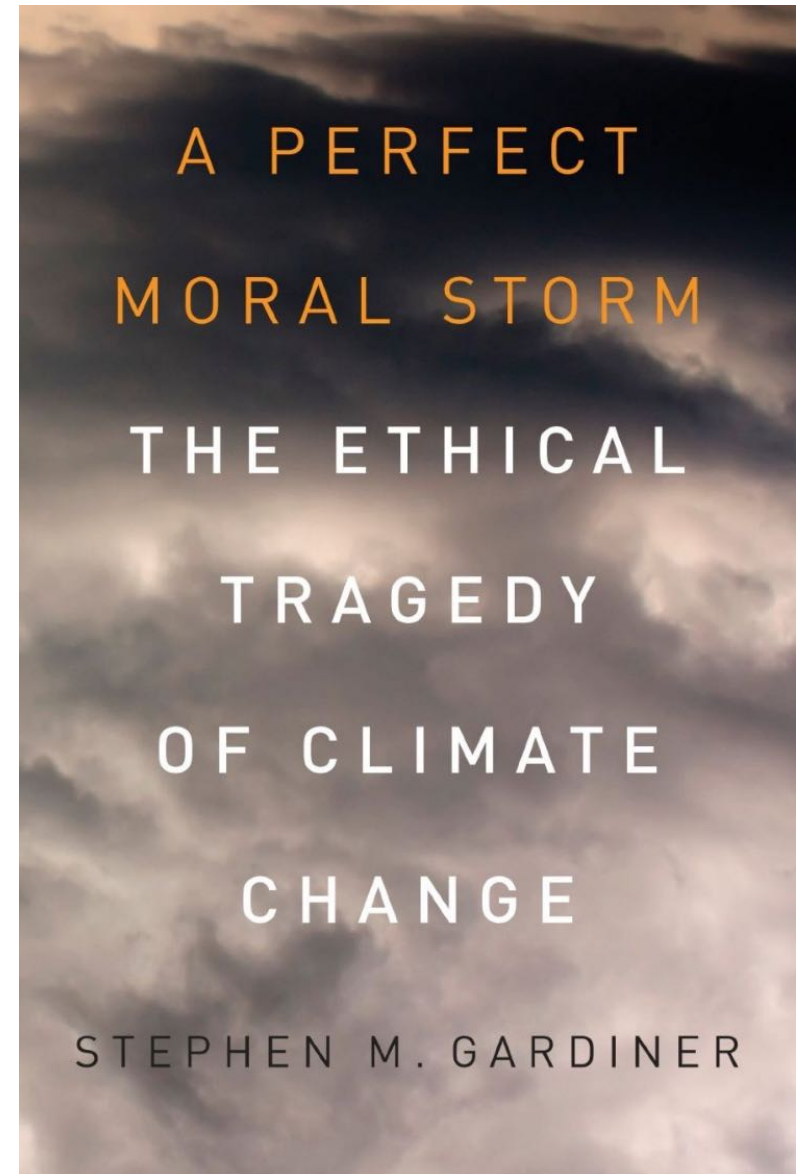
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A Very Old Story

guilt



Shame Paralyzes



- Deeply resonant!
- Pits people and groups against one another
- Deflects attention from actual solutions
- Neutralizes effective action needed to avoid grave harm!



URGENCY & AGENCY



The New Climate War

the fight
to take back
our planet

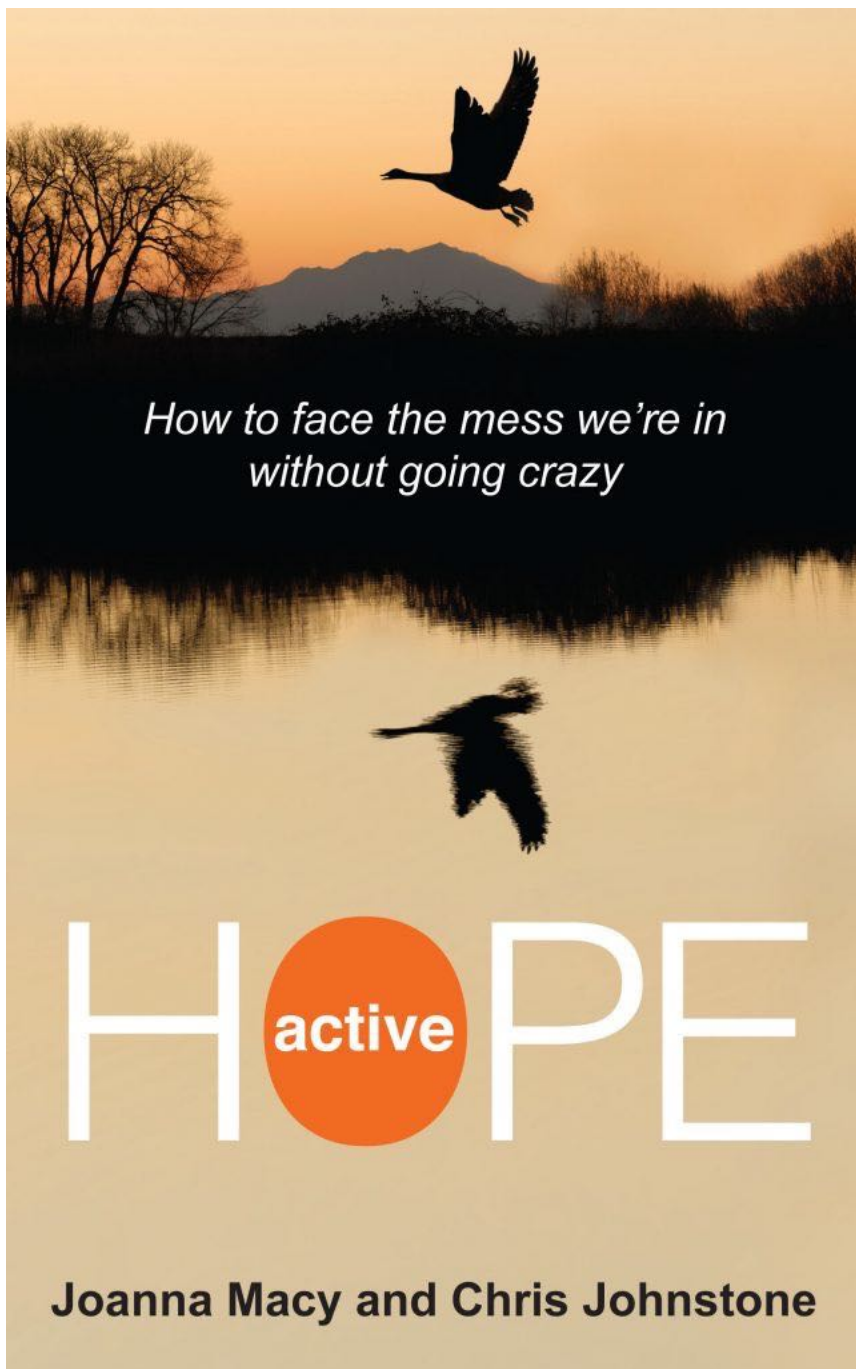
'Shows us how we can take the bold
steps we must all take together to
win the battle to save this planet.'
GRETA THUNBERG

Michael E. Mann



A man with a beard and dark hair is shown in profile, looking upwards and to the right. He is wearing a dark, textured garment. The background is dark and out of focus, with some light-colored, textured elements visible on the right side.

What do we say to the God of Death?



“Is there hope?” is the wrong question

- *There is no such thing as “game over” or “too late” or “screwed” or “no hope.”*
- *It is certainly not the case that “we have only 12 years to act” – This fight ... will last far beyond any of our lifetimes*
- *The stakes will always be enormous; time will always be short; there will never be an excuse to stop fighting.*
– Dave Roberts (@drvox)

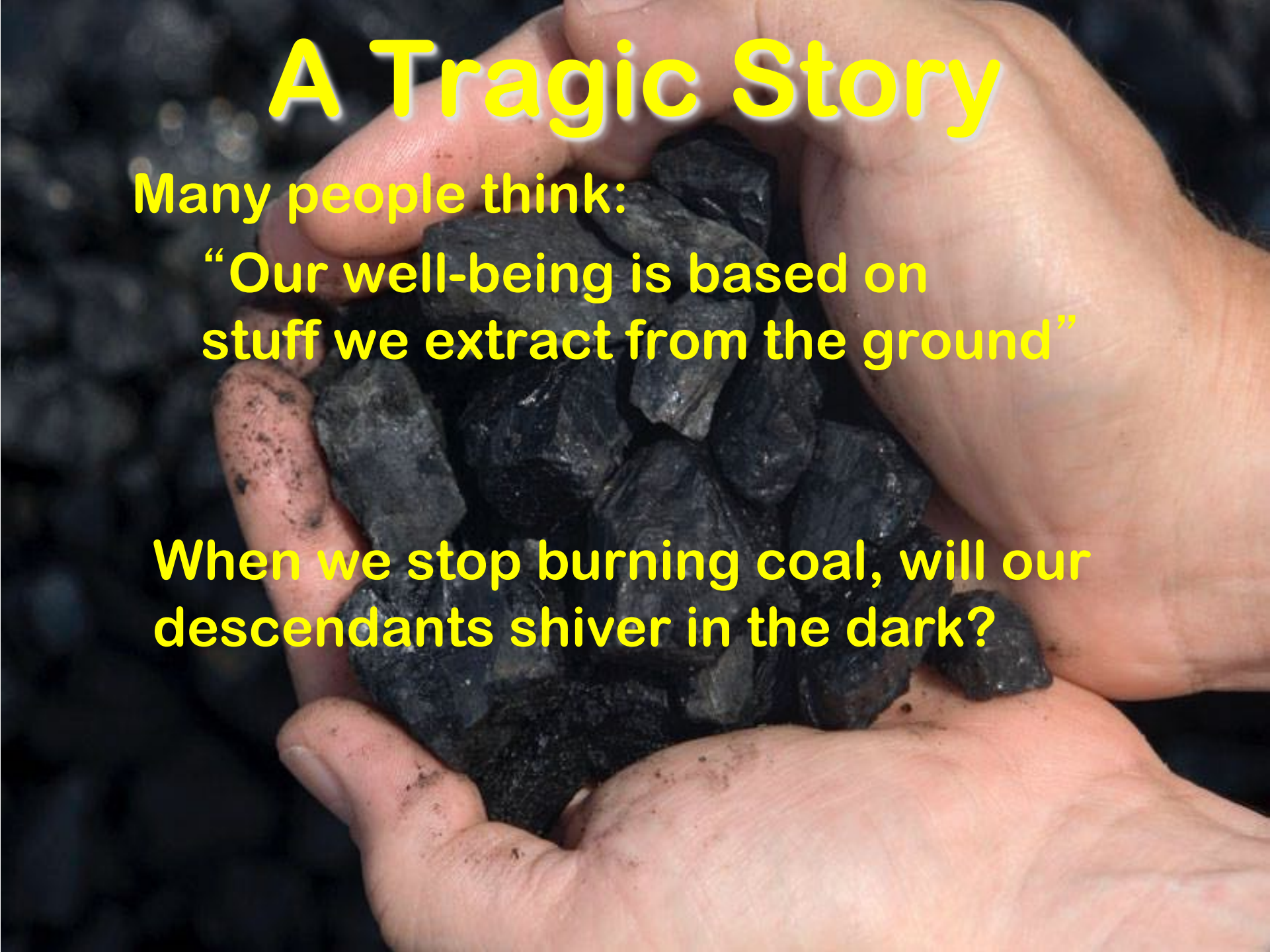
Hope is a verb!

A Tragic Story

Many people think:

“Our well-being is based on
stuff we extract from the ground”

When we stop burning coal, will our
descendants shiver in the dark?



A Better Story

*We build our world with the sweat of
our brows and the sparks in our souls*

Make the World Better!

