SOCIAL SCIENCE

POWER – why giving it up might just save us.

A rich, moving, and necessary treatise from our most accomplished, coherent, and compassionate thinker on sustainable futures.

– **Douglas Rushkoff**, author, *Present Shock* and *Team Human*

Impeccably researched and masterfully written, this book explains how and why humanity is driving itself off the cliff.

– **Dahr Jamail**, author, *The End of Ice*

This is the story of power – humanity's power over nature and the power of some people over others.

How has *Homo sapiens* become powerful enough to threaten a mass extinction and disrupt the Earth's climate? Why have we developed so many ways of oppressing one another? Can we change our relationship with power to avert ecological catastrophe, reduce social inequality, and stave off collapse? These questions – and their answers – will determine our fate.

Power traces how four key elements developed to give humans extraordinary power: tool making ability, language, social complexity, and the ability to harness energy sources – most significantly, fossil fuels. It asks whether we have, at this point, overpowered natural and social systems, and if we have, what we can do about it.

Most crucially, the book explores how self-limitation of power is rooted in evolution and human history and why, at this vital moment, we must rapidly relearn the lessons of power if humanity is to have a thriving future.

Power *reminds us that Richard Heinberg is one of the most important public intellectuals in the conversation about society's future.*

– **Chuck Collins**, author, *The Wealth Hoarders*

Heinberg's panoramic review of known forms of power is both sobering and inspiring.

– **Joanna Macy**, author, *World As Lover, World As Self*

RICHARD HEINBERG is the author of thirteen previous books, including *The Party's Over*, *Powerdown*, *Peak Everything*, and *The End of Growth*. He is Senior Fellow of the Post Carbon Institute and is widely regarded as one of the world's most effective communicators of the urgent need to transition away from fossil fuels. He lives in Santa Rosa, CA.

new society PUBLISHERS
www.newsociety.com

ISBN 978-0-86571-967-5
52499>
9 780865 719675
US/CAN $24.99

POWER

RICHARD HEINBERG

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An impressive, sweeping, and thought-provoking narrative.
— **DENNIS MEADOWS**, co-author, *The Limits to Growth*

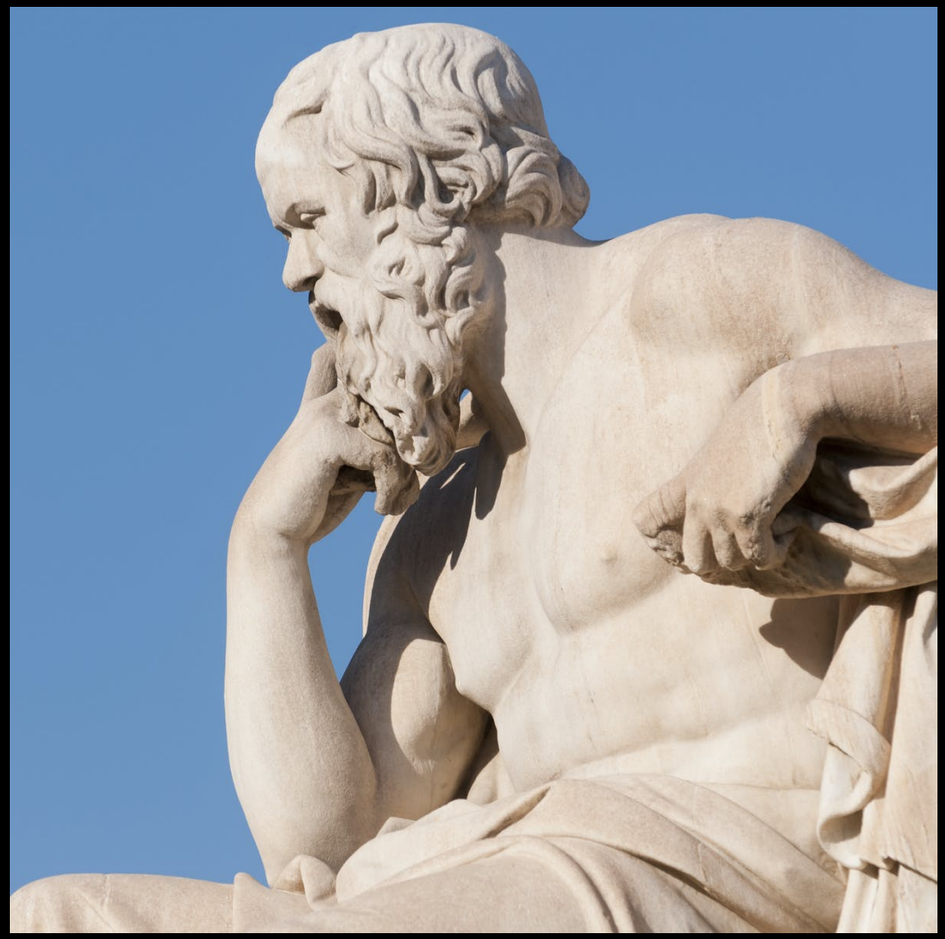
POWER

LIMITS AND PROSPECTS FOR HUMAN SURVIVAL

RICHARD HEINBERG

Objective:

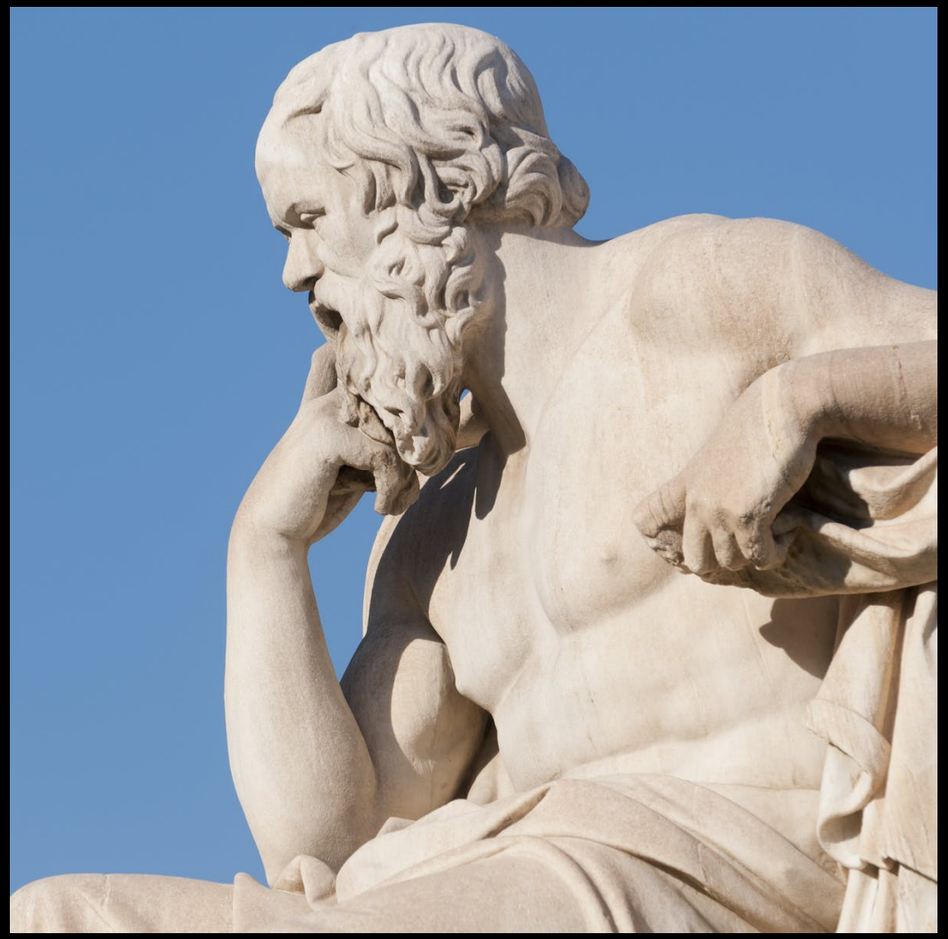
Understanding and wisdom; practical applications may follow



Objective:

Understanding and wisdom; practical applications may follow

Wisdom: prioritizing what's truly important (from a long-range perspective), living well within limits



Three questions

1. How has *Homo sapiens*, one species out of millions, become so powerful as to bring the planet to the brink of climate chaos and a mass extinction event?

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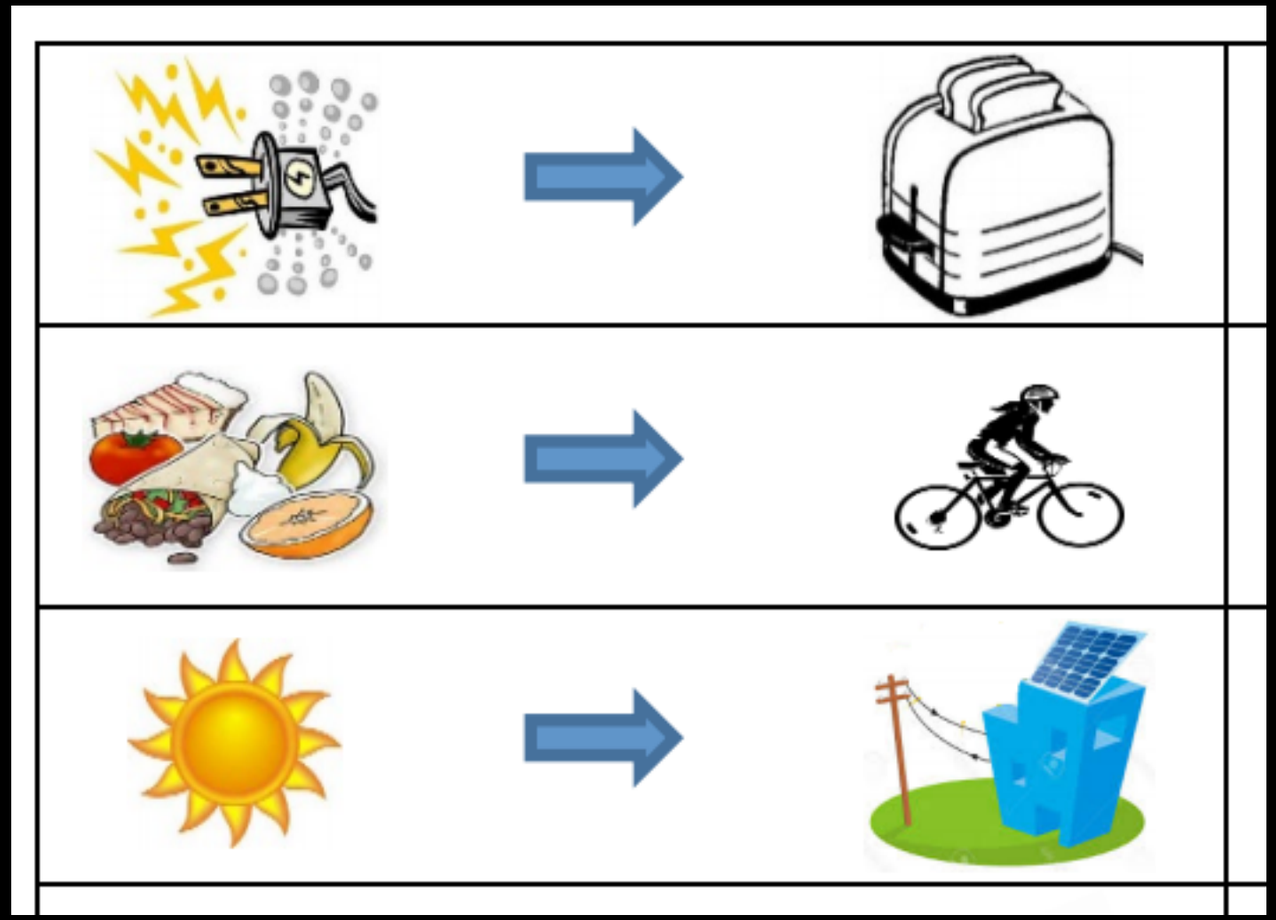
2. Why have we developed so many ways of oppressing and exploiting one another?

3. Is it possible to change our relationship with power so as to avert ecological catastrophe, while also reducing social inequality and hence the likelihood of political-economic collapse?

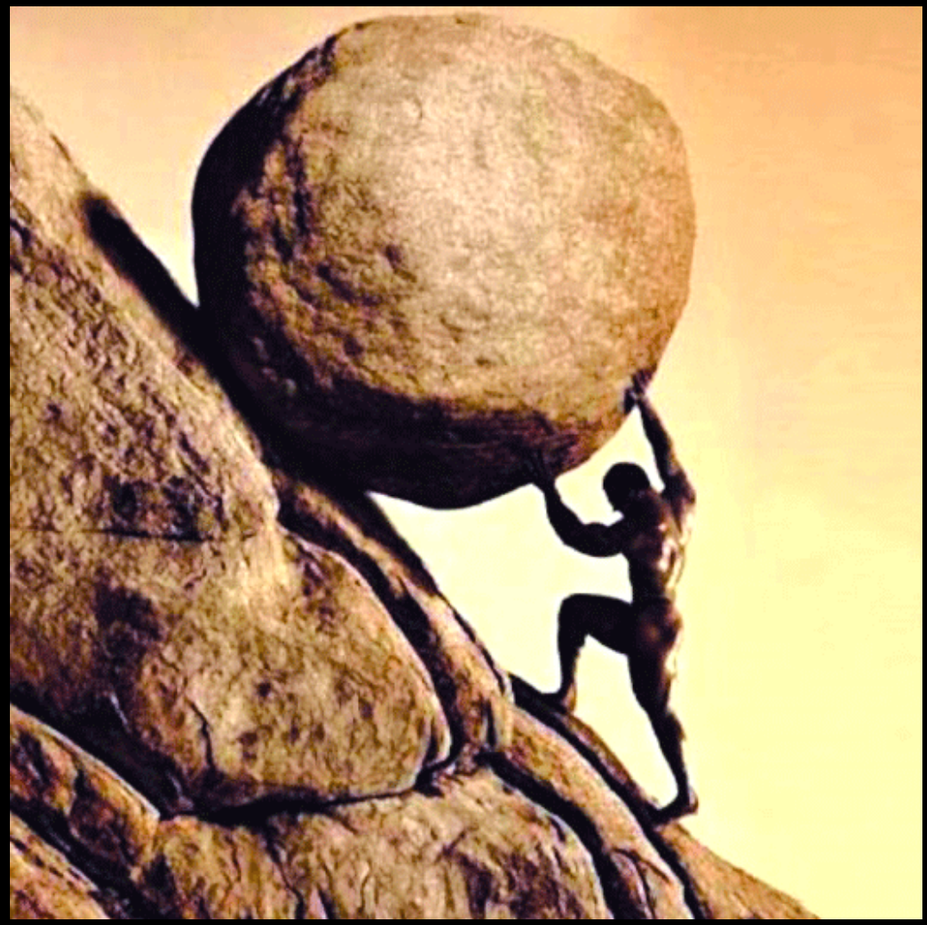
What is power?

1. The rate of energy transfer



What is power?

1. The rate of energy transfer
2. The ability to do something



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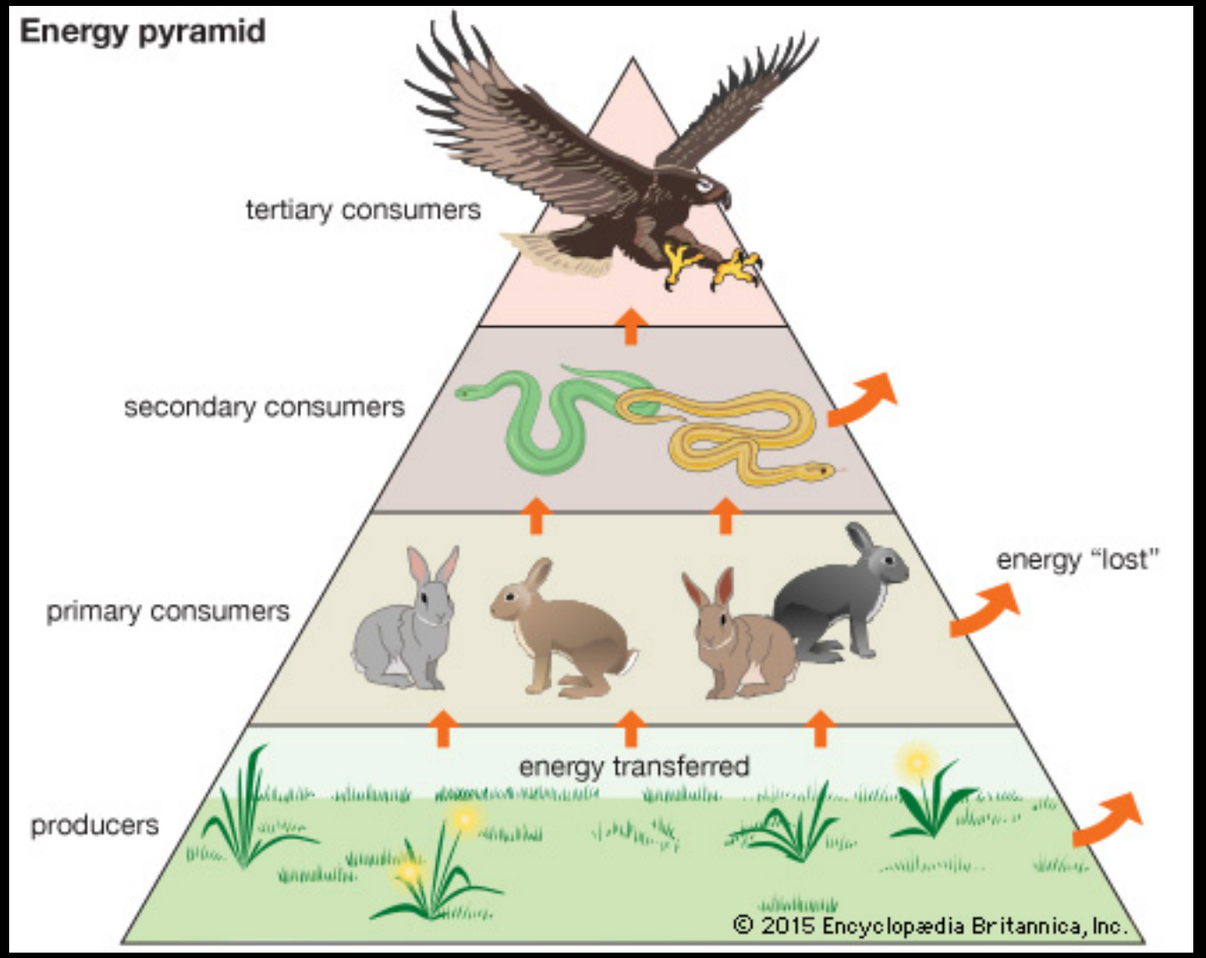
2. The ability to do something
3. Social power: the ability to get someone else to do something
4. Horizontal social power: We can do this together!
5. Vertical social power: Incentives and threats
6. The power of ideas, inspiration, force of personality, sexual attraction, love

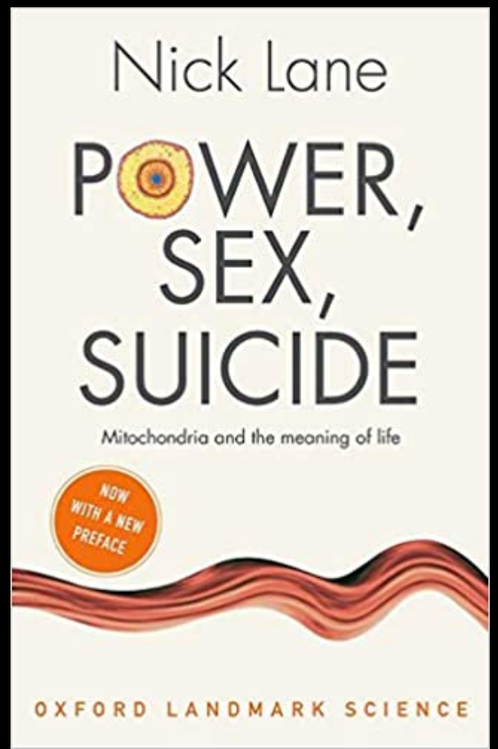
Energy is everything

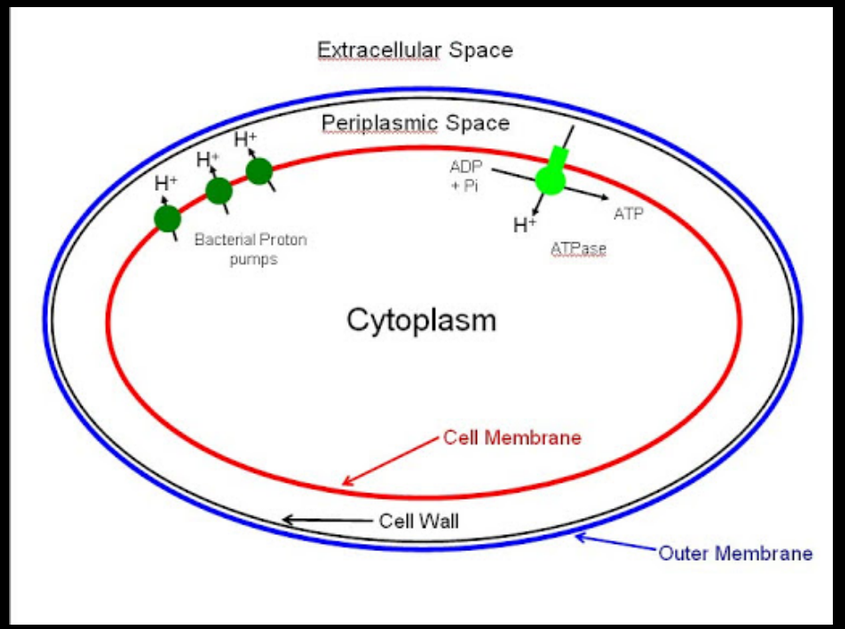
If you want to understand an organism, ecosystem, or society…
*follow the energy (i.e., **power**)!*



Power is everywhere

A thread that ties together astrophysics, physics, cell biology, ecology, evolution, human history, and current events





Life is powerful

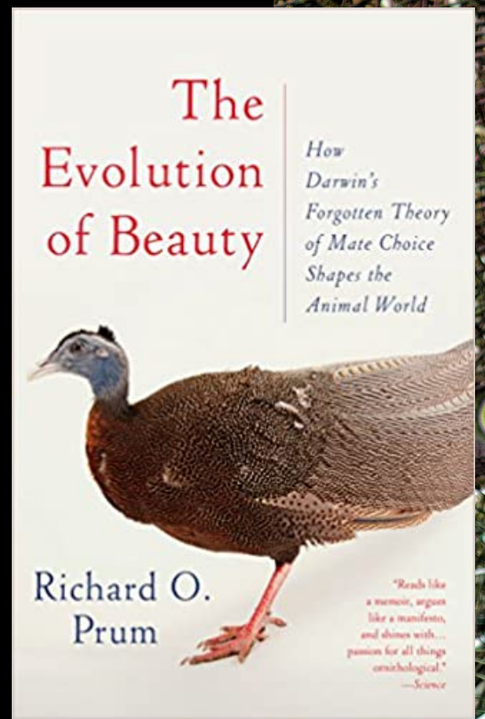
- Gram-for-gram, the average organism is 10,000 times as powerful as the Sun.
- The Sun is very massive. Dividing luminosity by mass = 0.0002 milliwatts of power per gram.
- A human, eating an average diet and converting food energy into heat and work, averages 2 milliwatts per gram.

Power in nature

- Maximum power principle
- Evolution of communication, sociality, tool making

The power of beauty

- Origin in sexual selection
- Gradually, beauty becomes a goal by itself
- Nature is *intentionally* beautiful!
- Aesthetic decadence



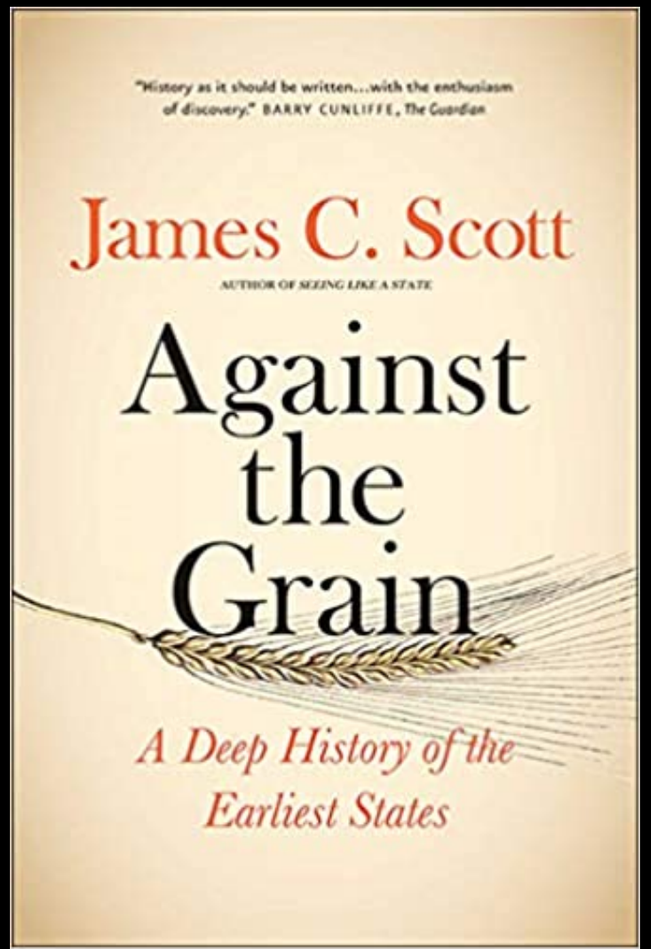
Evolution of human power

- Fire
- Tools
- Clothing
- Language

Power over ecosystems and other species

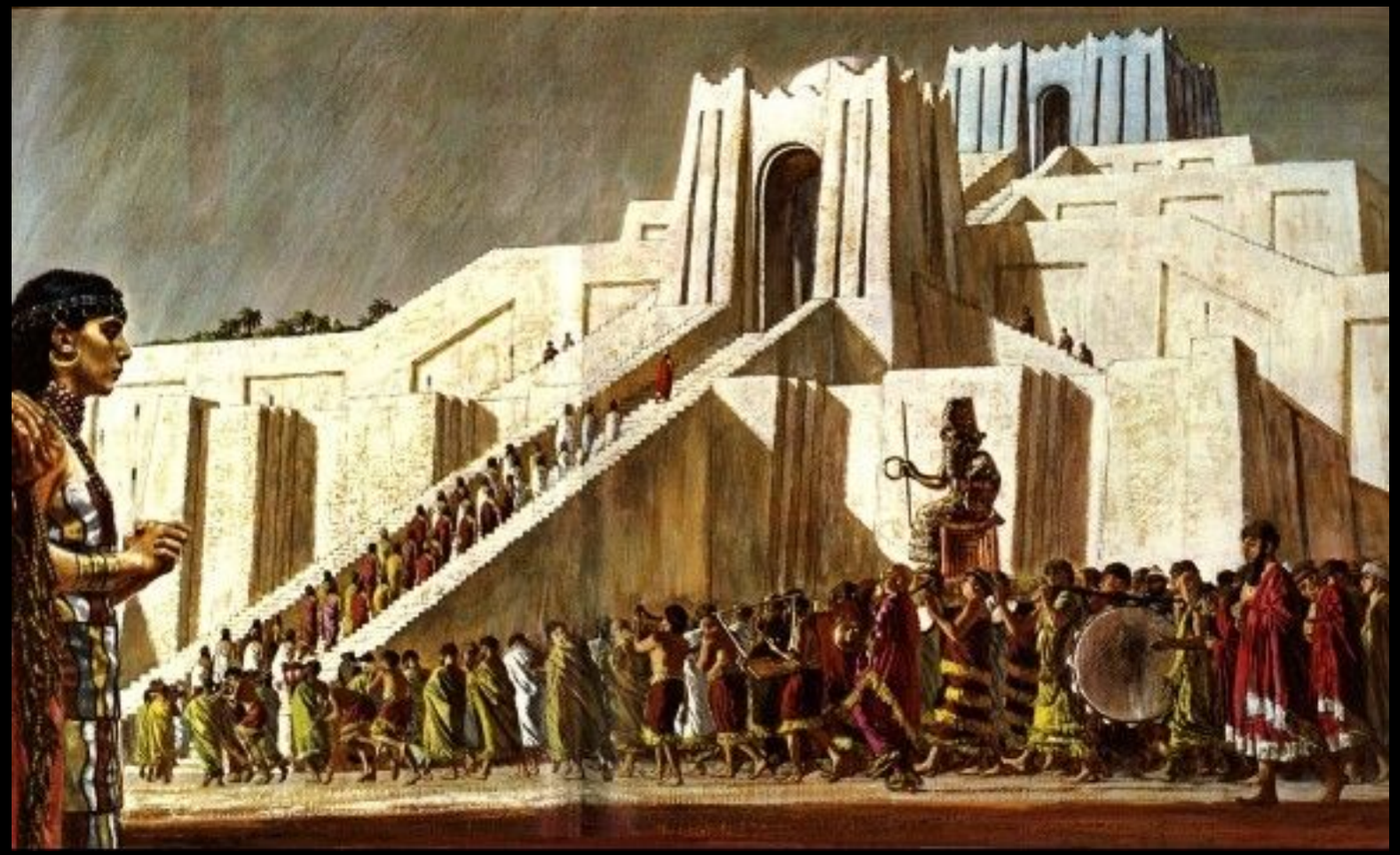
Evolution of vertical social power

- Domestication—self-domestication, animal domestication, and domestication of other humans
- War: the catalyst
- From Big Man to divine king
- Role of grain agriculture
- Key development: the state (6,000 years ago)



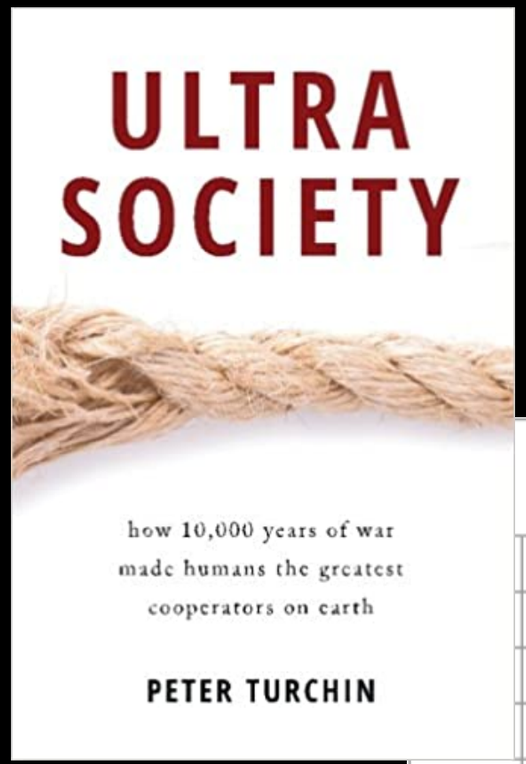
Evolution of vertical social power

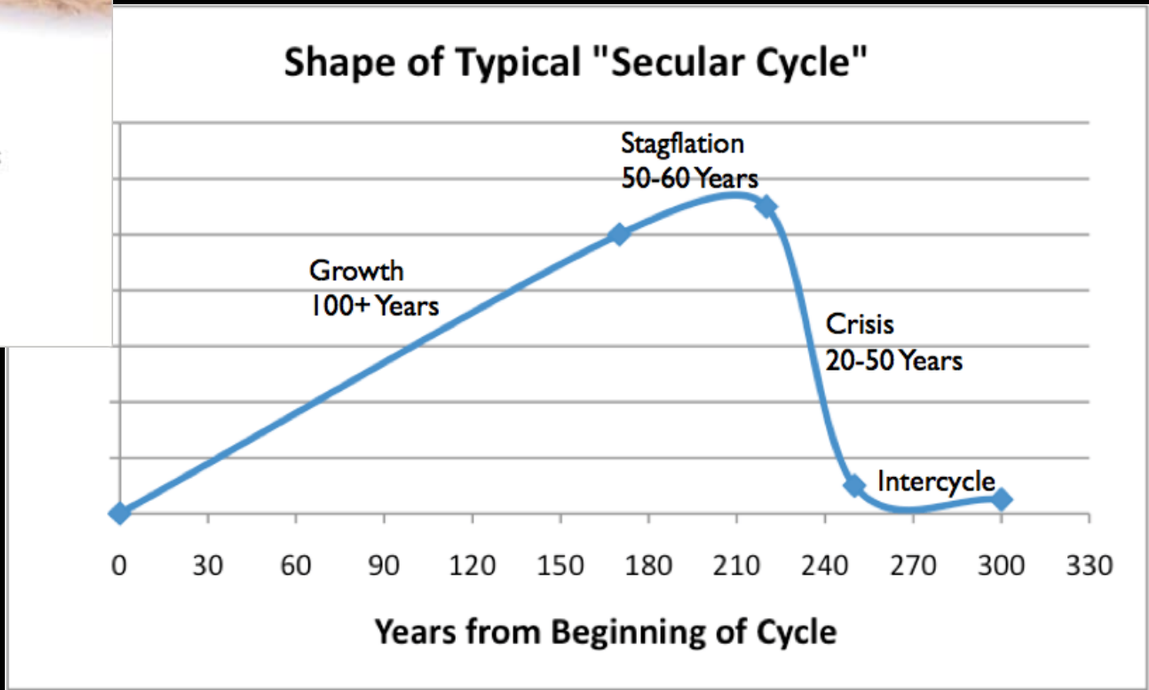
- Money
- Weapons
- Communication technologies
- Social complexity (including slavery)



Civilizations and cycles

- Expansion and retreat
- Wealth (power) concentration and competition among elites
- Collapse is a “normal” and predictable periodic feature





Fossil fuels: the Great Acceleration

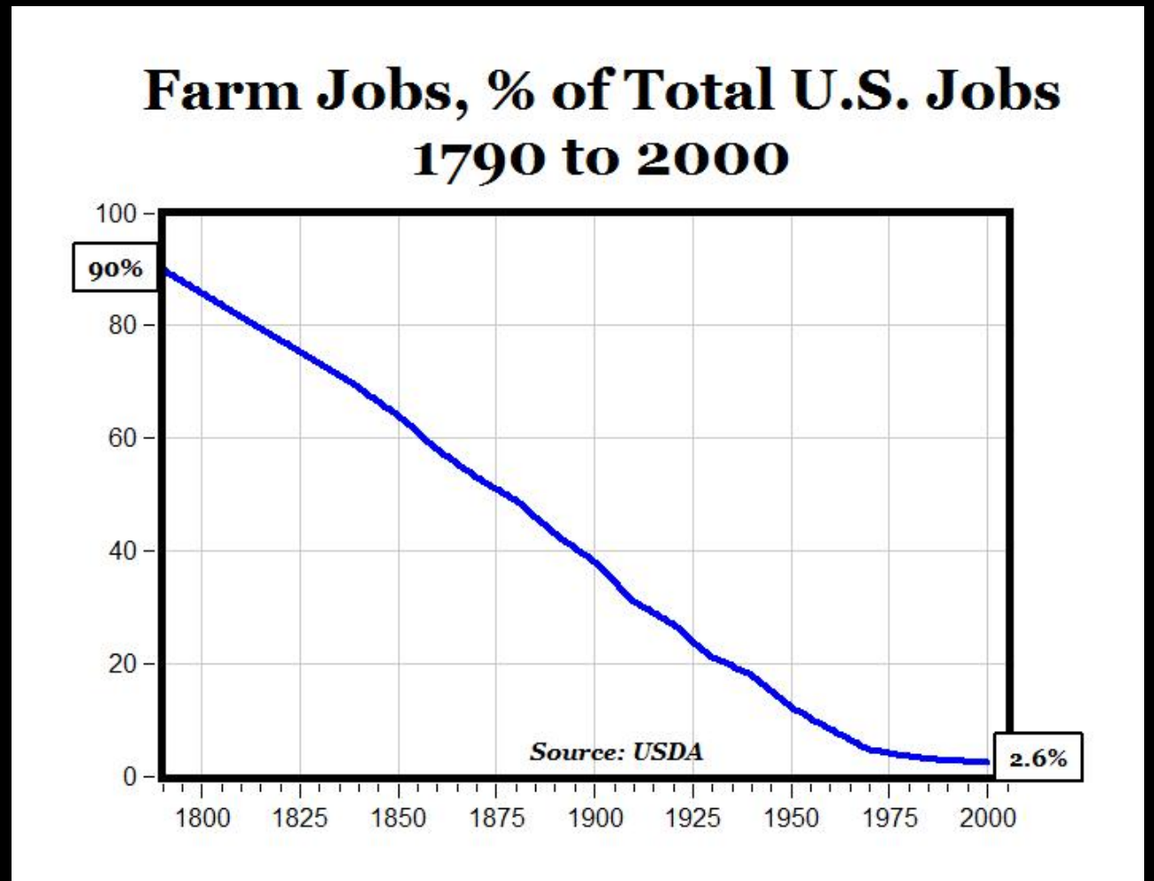
Required:

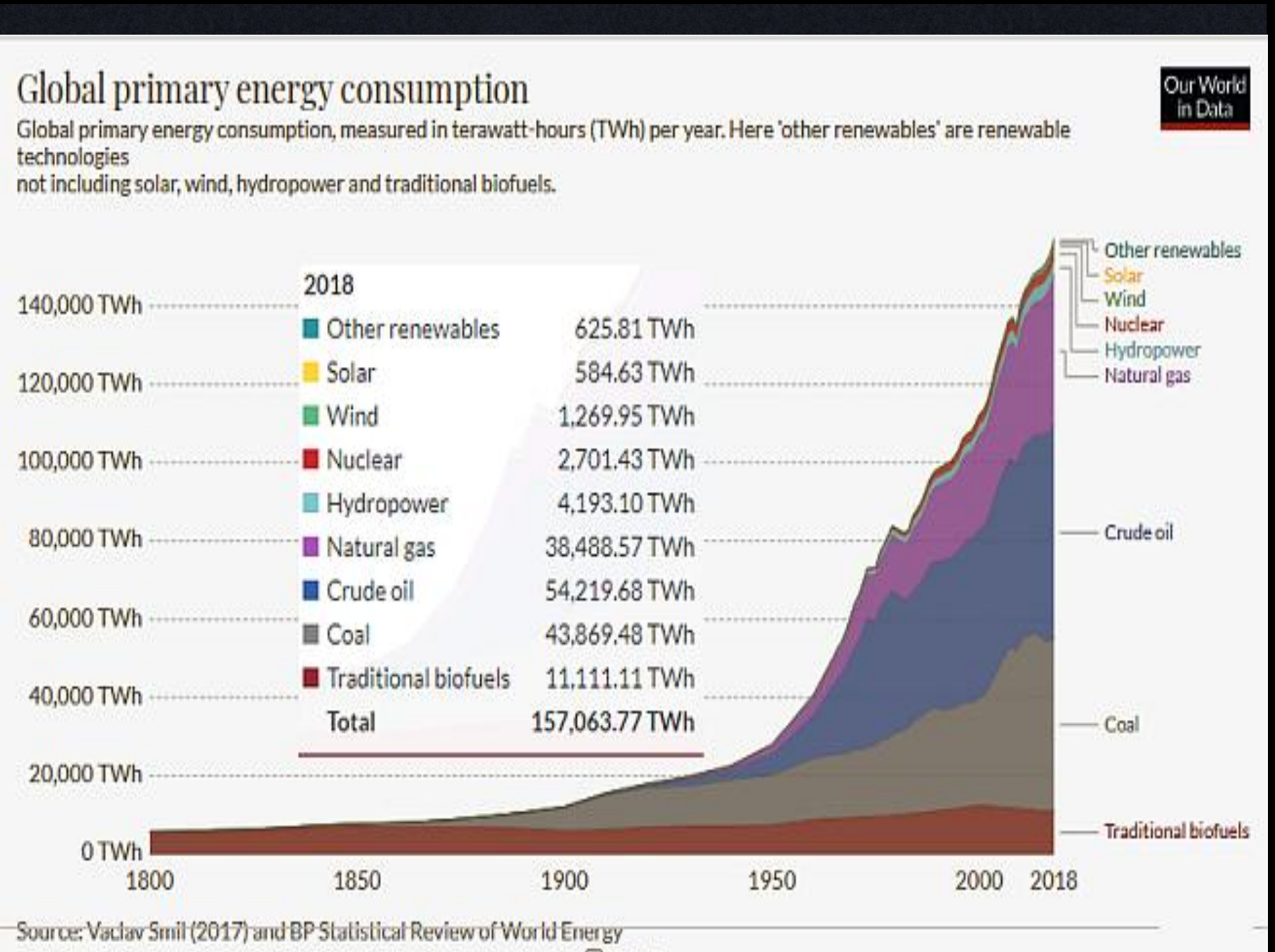
- Private ownership of natural resources
- Government protection for investors
- Incentives for innovation


PLOUGHING MATCH.
132. Kerry. Sydney.

Growth of employment and the "middle class"

What does this graph gloss over?

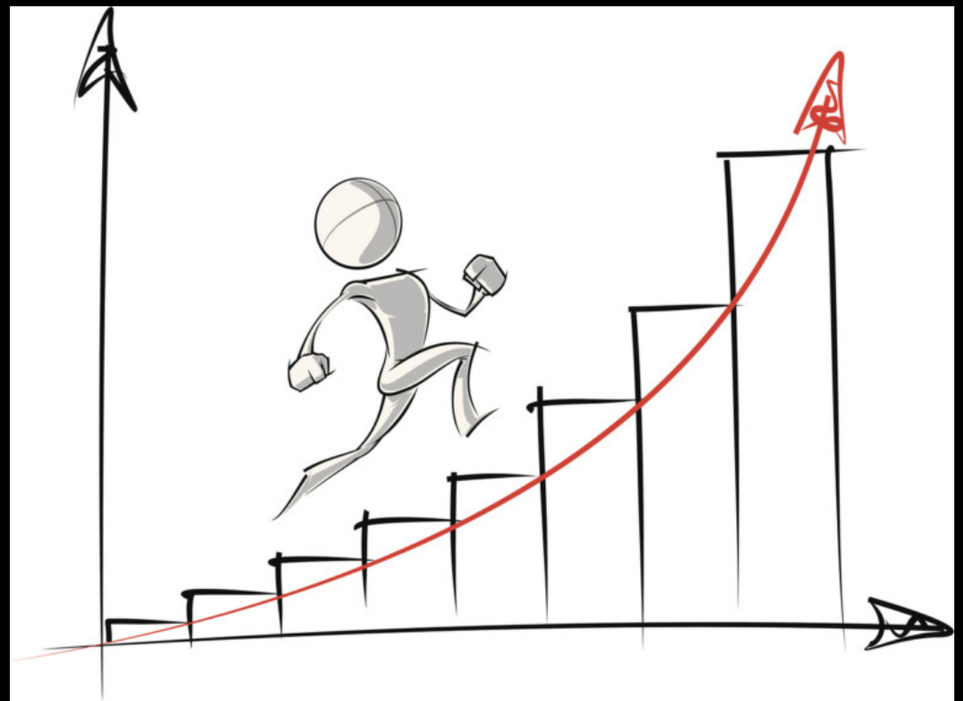




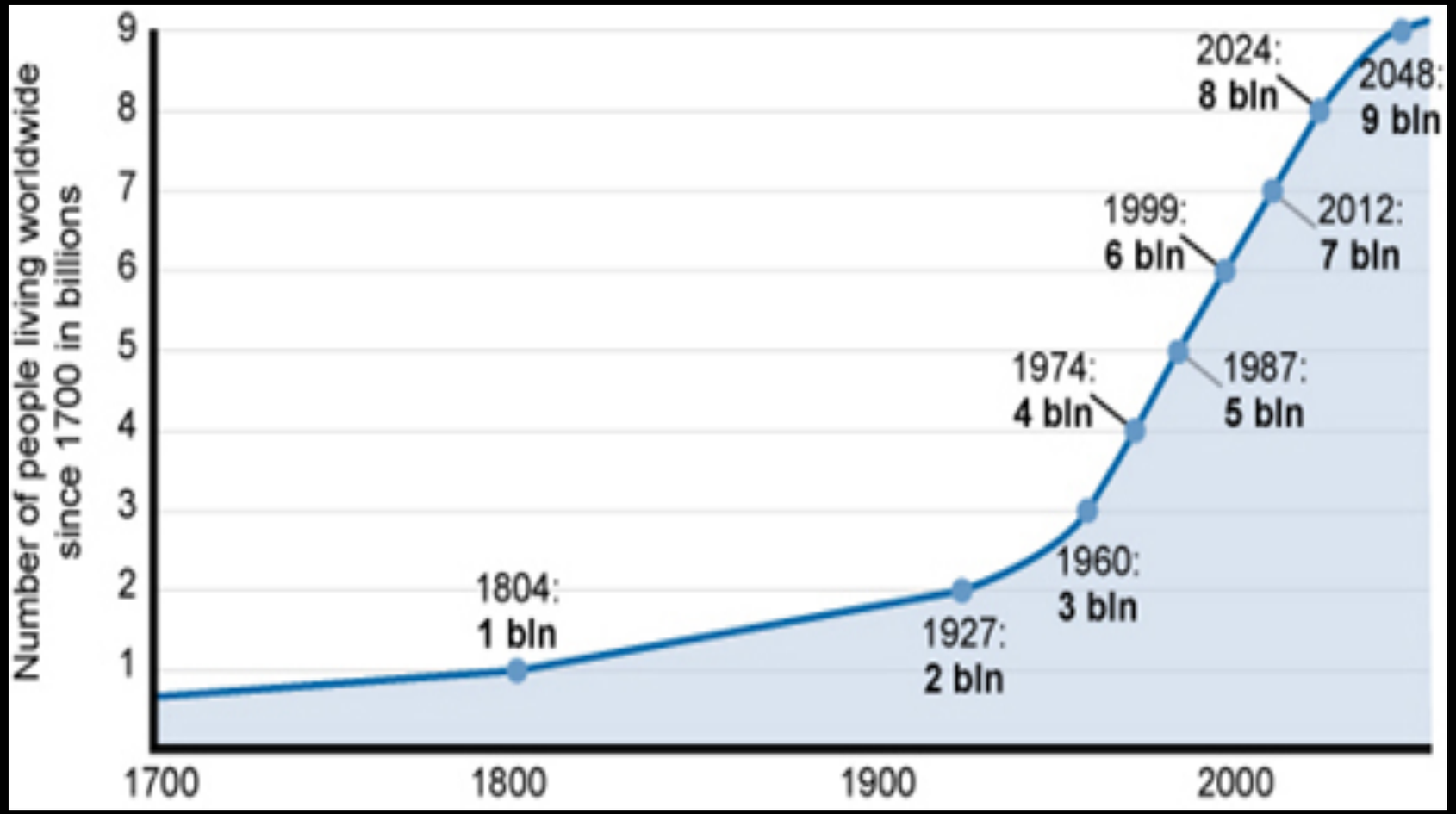
Energy enables growth; growth requires energy

The peril of exponential growth

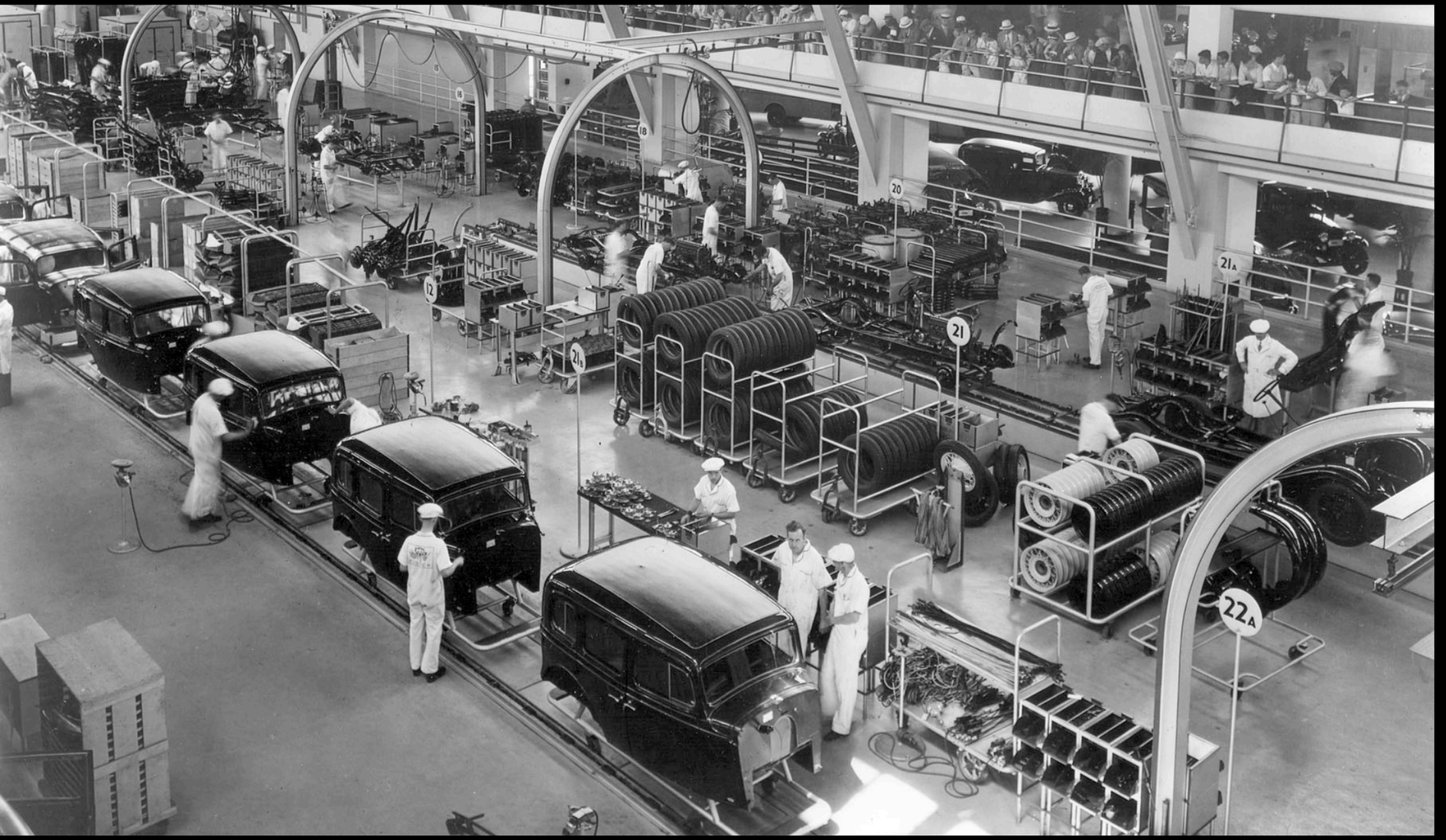
- Implies a doubling time: at 1 percent annual growth, a quantity doubles in about 70 years; at 2 percent, 35 years; at 7 percent, 10 years; etc.
- The global economy (including energy usage and extraction of non-renewable resources) doubled in size in the last 25 years
- Since 1995 we have used about half the NR resources extracted since the origin of humans



Human population



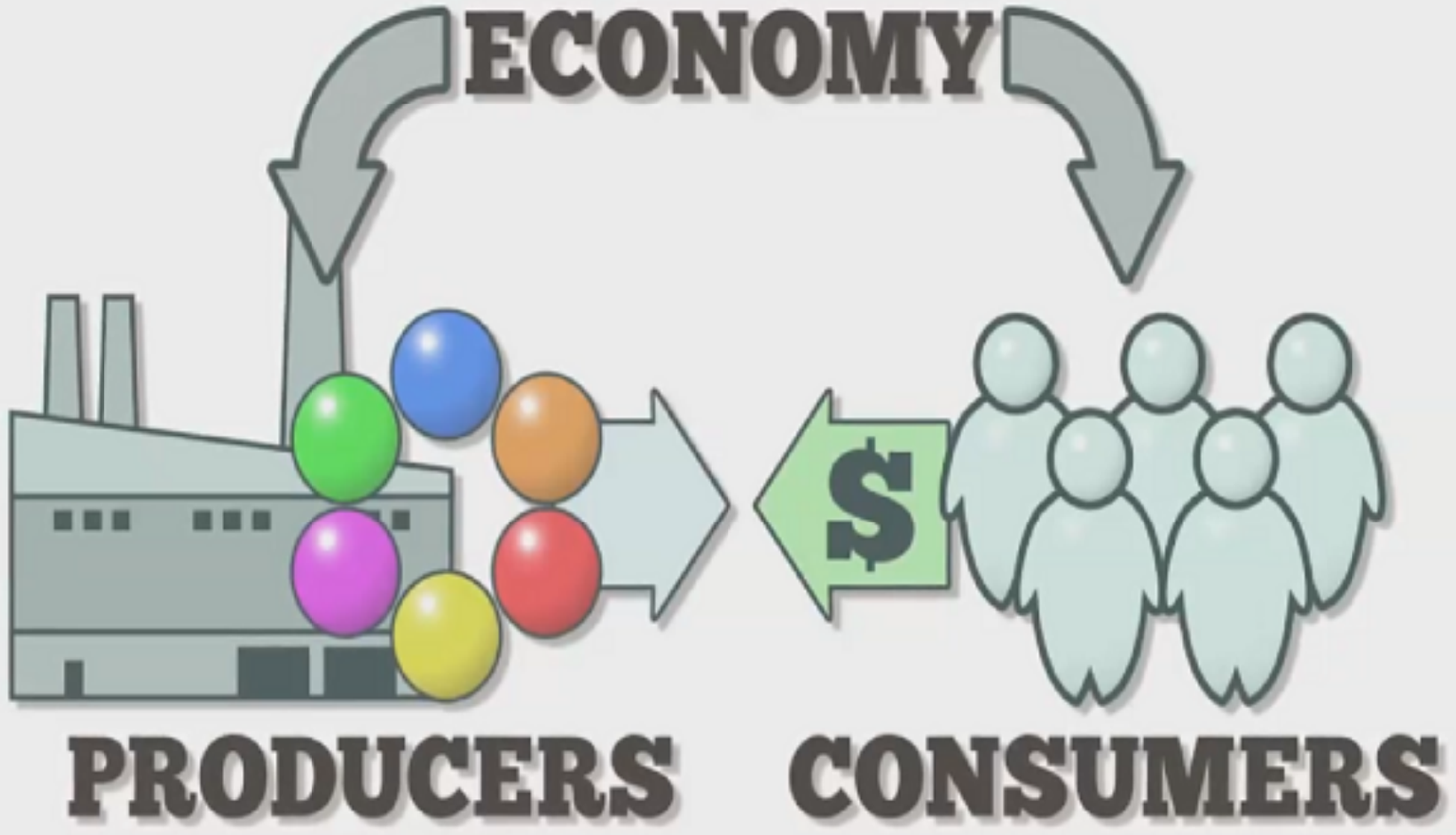
Sept. 2021: ***7.9 billion***



Application of fossil fuel energy to production…

…led to urbanization and problems of overproduction and underemployment

Solution: *consumerism*, a strategy to manageably expand the market economy

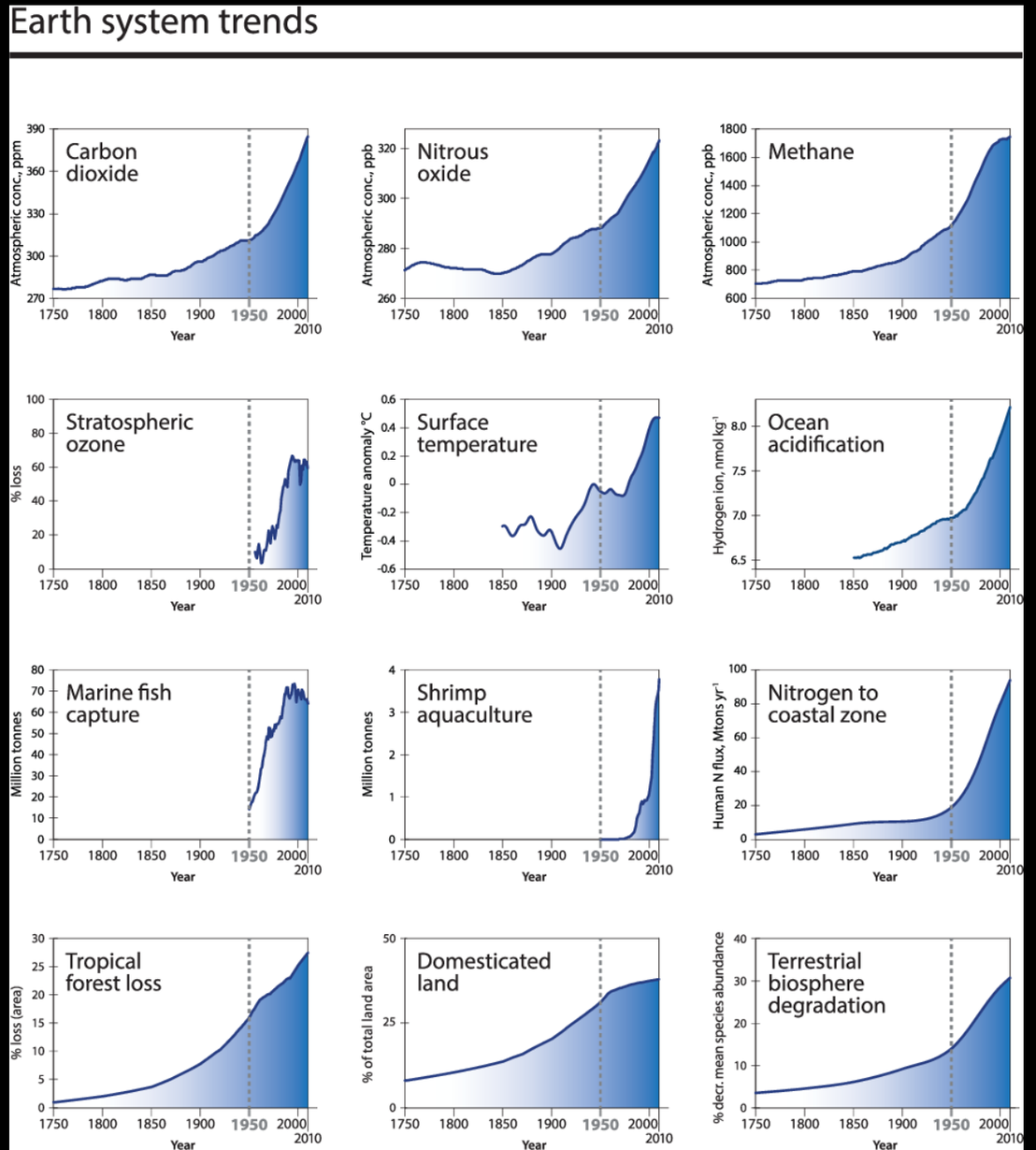


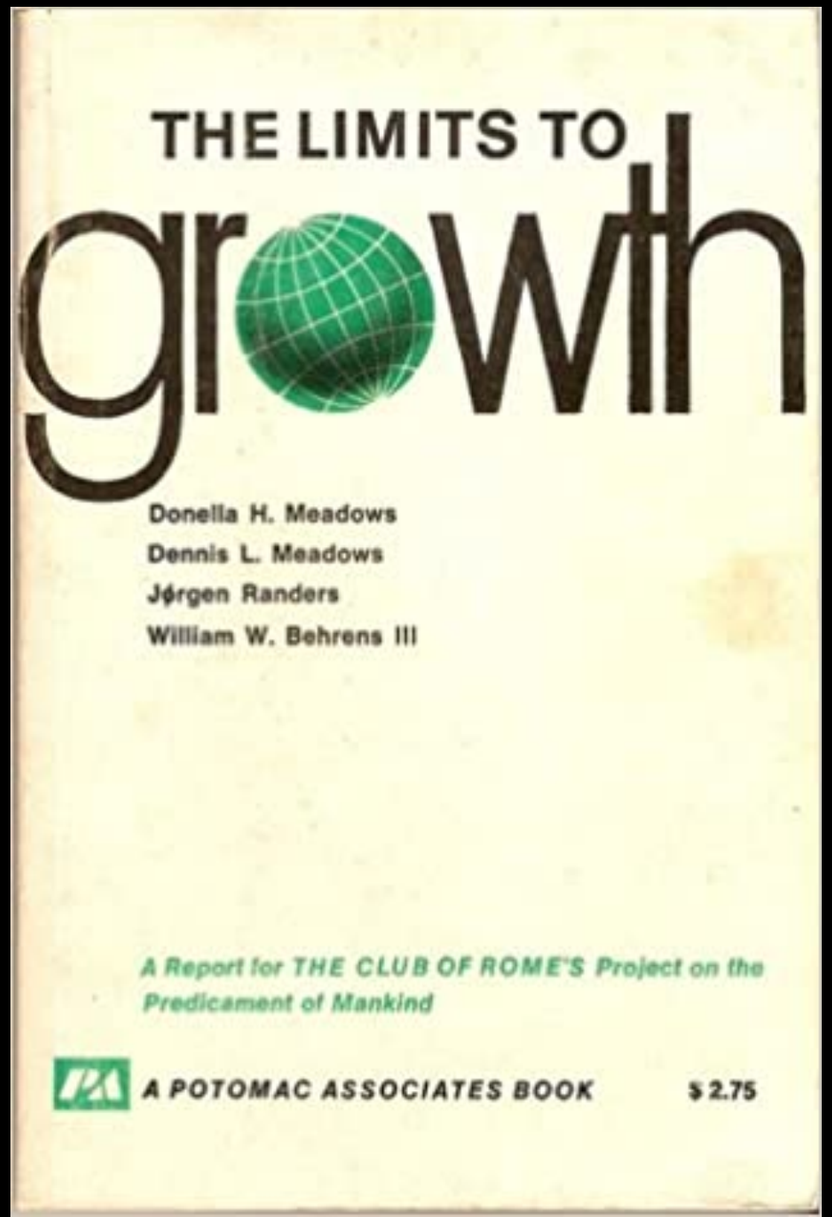
(What's missing here?)

The economy became a "thing" to be tracked and measured; growth became the goal

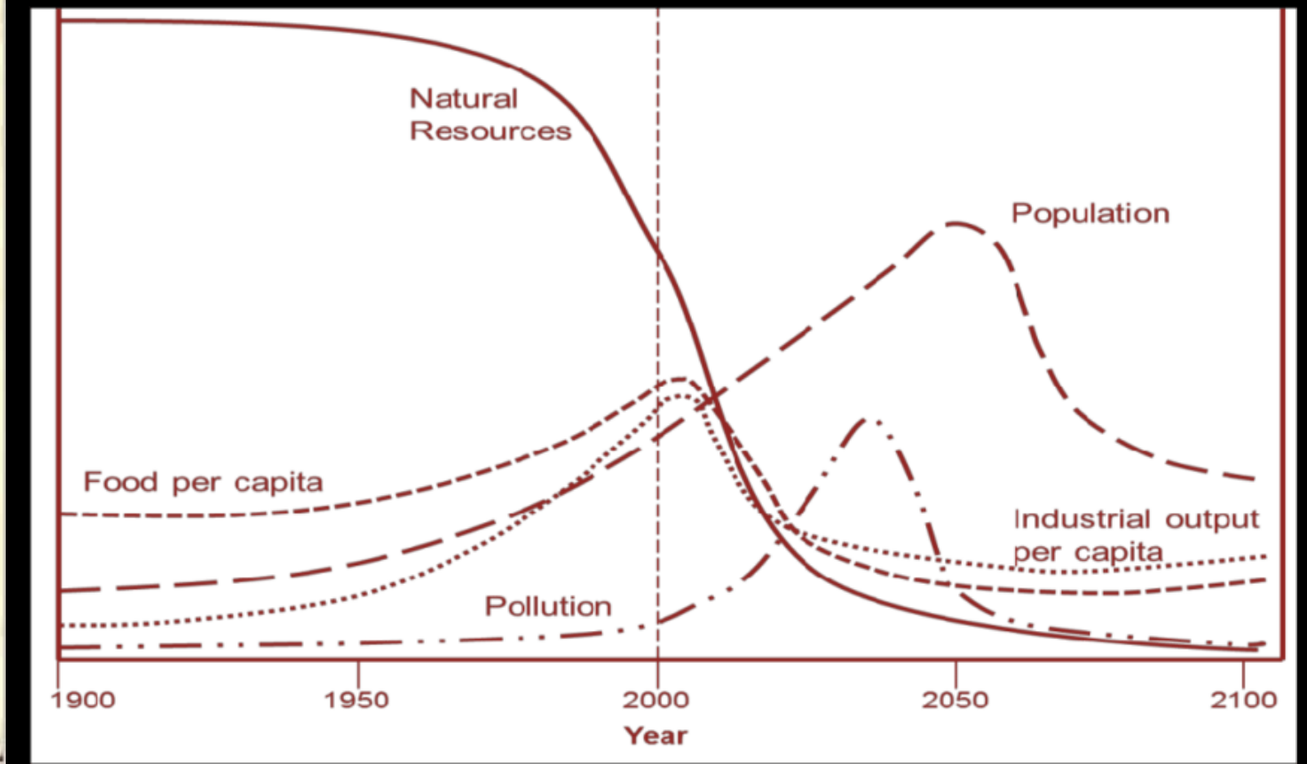
Overpowered

- Climate change
- Loss of wild nature
- Resource depletion
- Pollution
- Economic inequality
- Weapons of mass destruction




THE LIMITS TO
growth
Donella H. Meadows
Dennis L. Meadows
Jørgen Randers
William W. Behrens III
A Report for THE CLUB OF ROME'S Project on the Predicament of Mankind
A POTOMAC ASSOCIATES BOOK
$2.75

(1972)


Natural Resources
Population
Food per capita
Industrial output per capita
Pollution
1900
1950
2000
2050
2100
Year

HOW MANY EARTHS DOES IT TAKE?

(global productive hectares per capita)

EQUITABLE DISTRIBUTION WITHIN NATURE'S LIMITS

1.67 gha

EUROPEAN STANDARDS OF LIVING

4.5 gha

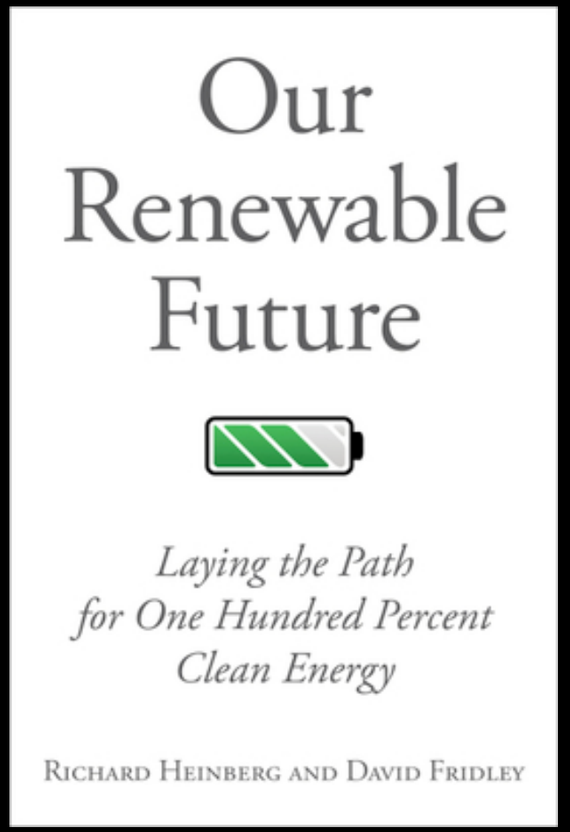
U.S. STANDARDS OF LIVING

6.8 gha

SOURCE: GLOBAL FOOTPRINT NETWORK

Climate change and power

- It’s not a technical problem with a technical solution
- It is a problem of power

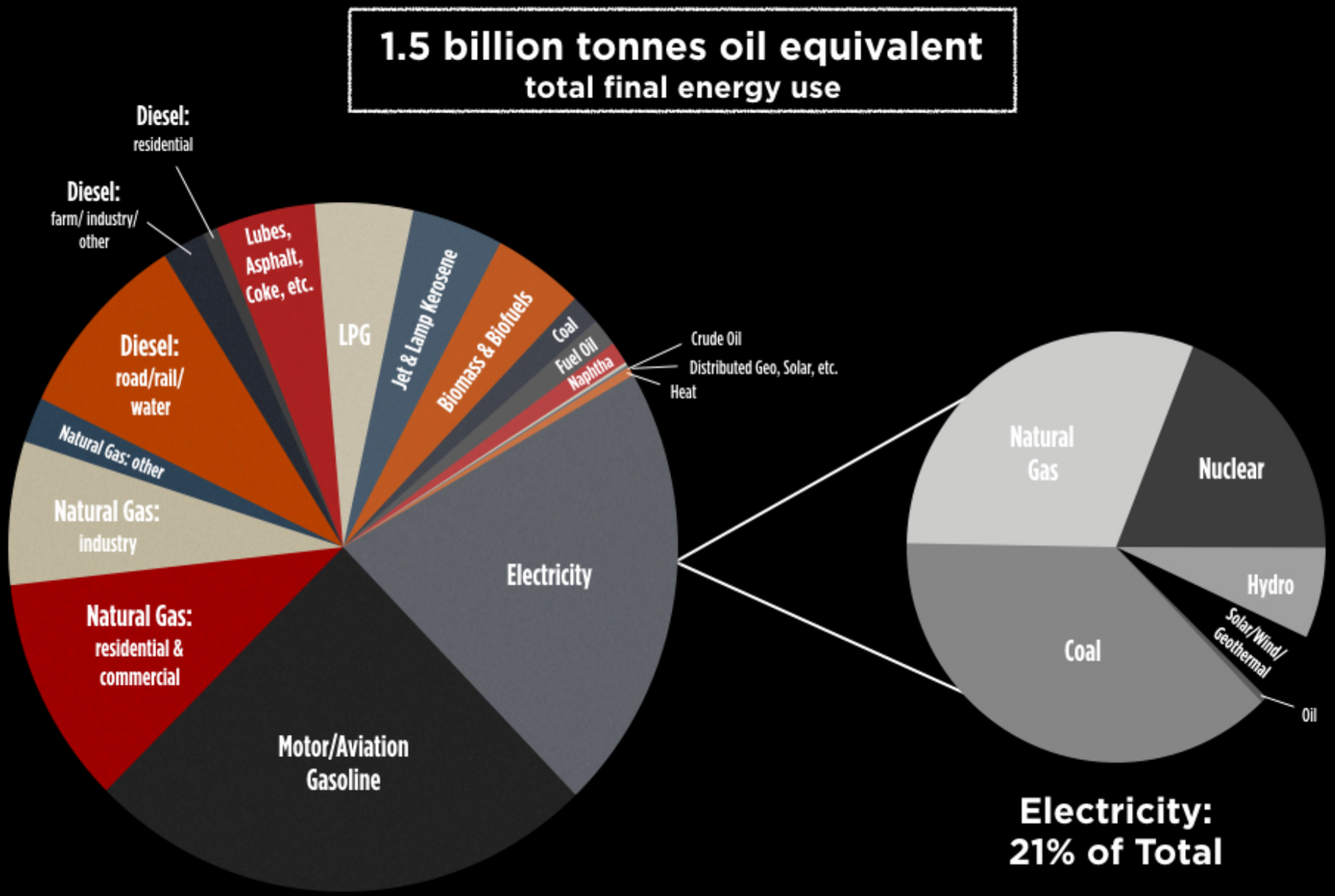


Intermittency

Solutions:

- Energy storage
- Source redundancy
- Demand management

The 20 percent conundrum



sources: IEA Energy Balances; U.S. EIA

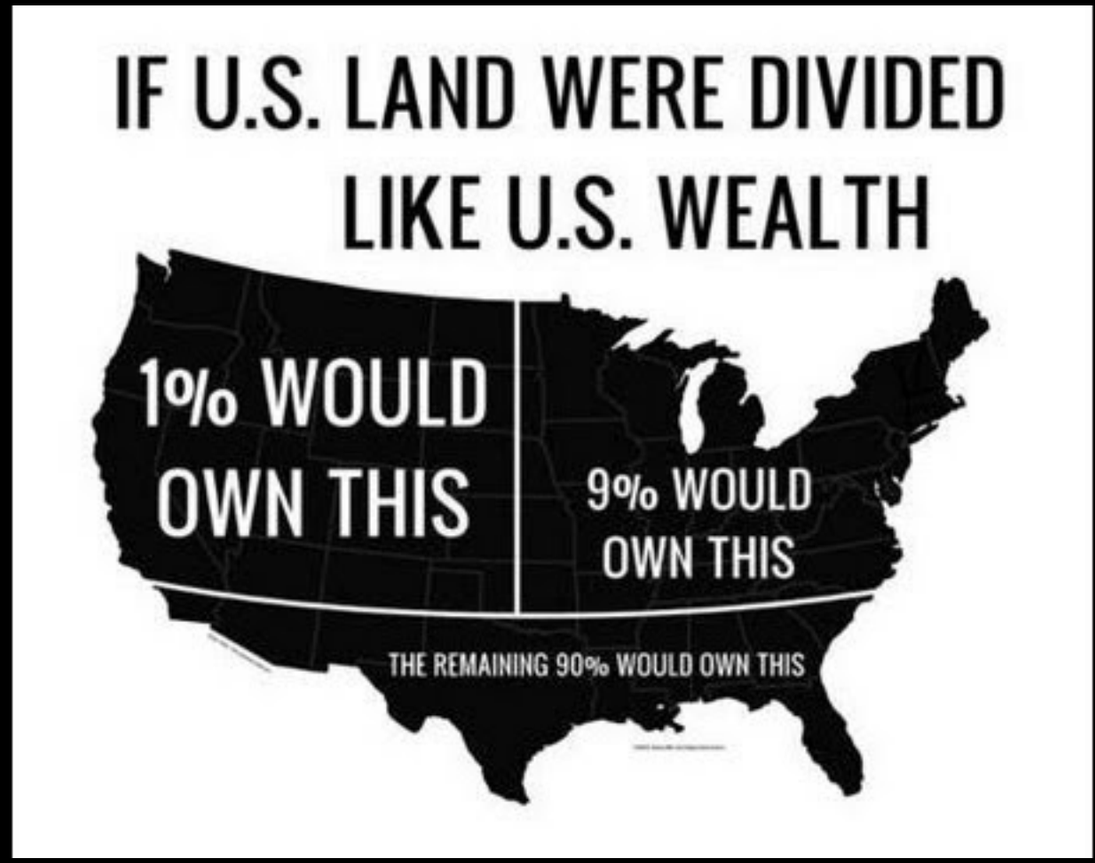
Scale is biggest hurdle

- If we try to replace all current energy usage quickly, the result will be a huge pulse in emissions
- Limits to crucial resources
- Land use tradeoffs

Inequality

The Global South contributes about 80 percent of the labor and resources that go into the global economy, yet the people who render that labor and those resources receive about 5 percent of the income the global economy generates each year.

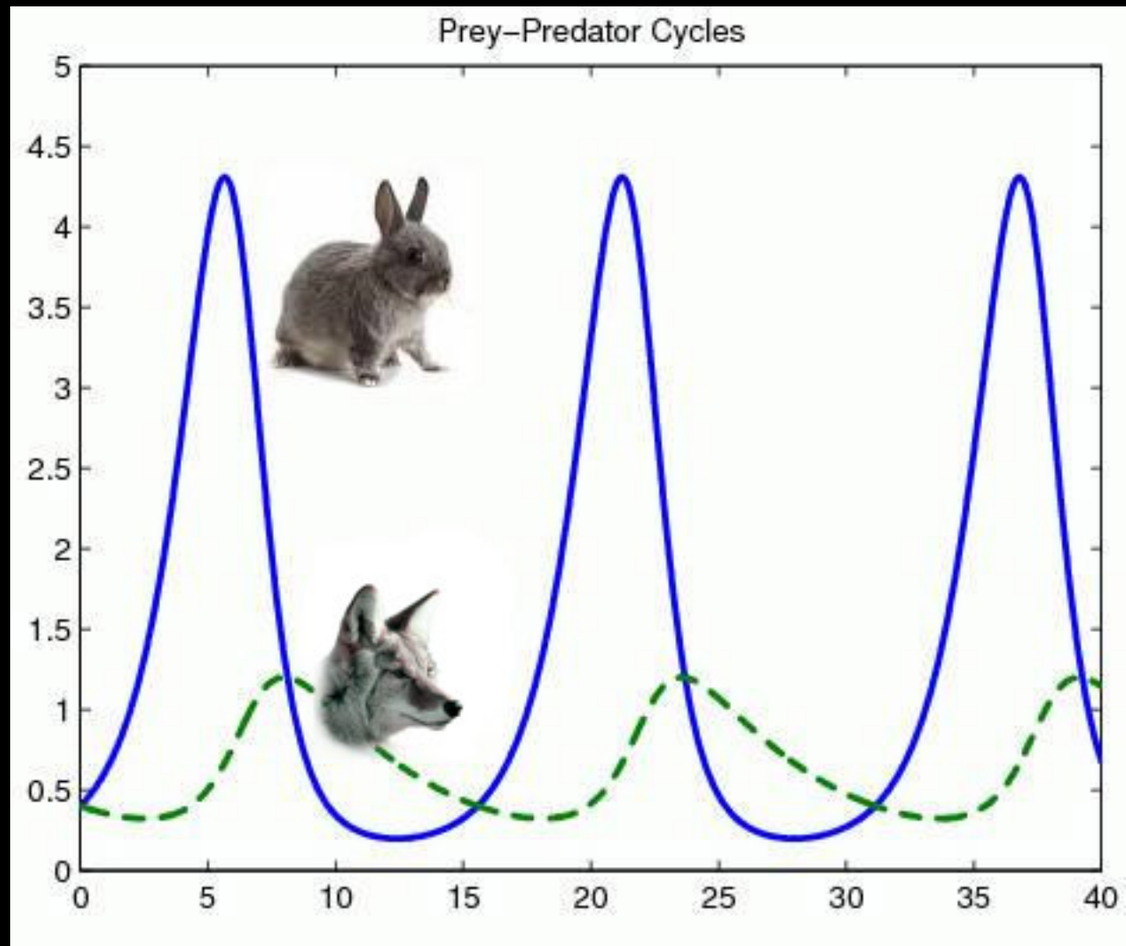
—Jason Hickel



Are we capable of power self-limitation?

Optimal power

- Optimum power principle
- Homeostasis
- Balancing mechanisms in ecosystems
- Societal power limiting efforts
- Destruction of growth capital



How we limit power

- Democracy
- Financial regulations
- Environmental regulations
- Taxes and redistributive programs
- Arms treaties

If we <u>can</u> limit power, why aren't we doing it?

- Too much power too fast (fossil fuels)
- Discounting the future

- Self-reinforcing aspects of capitalism

The future of power

- A spectrum of possibilities…
- …from collective self-annihilation to sufficient self-restraint

Our current path

All against all:

- Increasing inequality
- Erosion of trust
- Environmental breakdown leading to—
- Food system crises, localized famine
- Mass migrations
- Failure of governments even in currently rich countries

What must we self-limit?

- Population
- Resource extraction
- Waste dumping
- Energy usage
- Land use
- Inequality—global and national
- Armaments and resources devoted to them

Our deep future

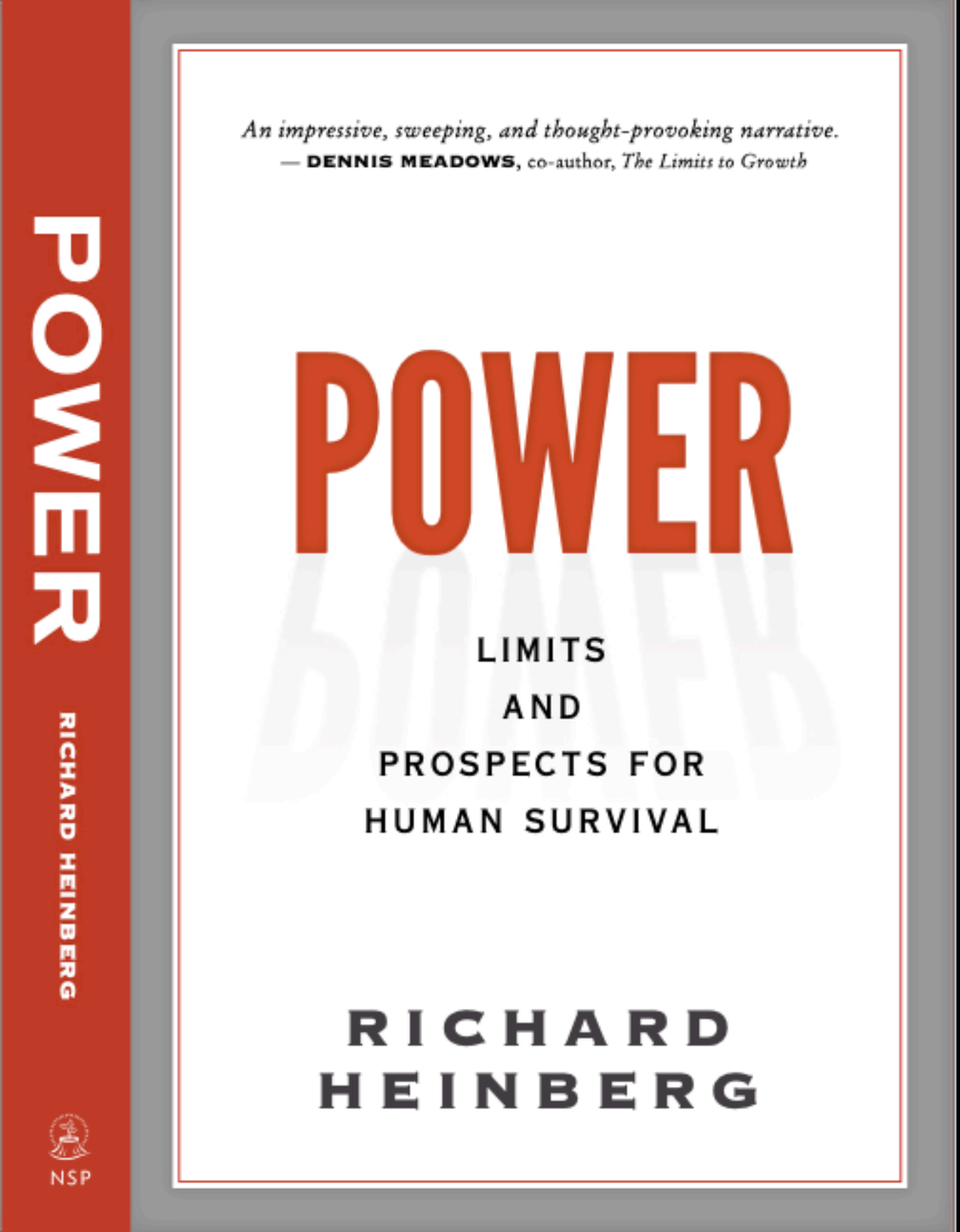
- Could the production, protection, and appreciation of beauty become a central human goal?
- Self-control as pathway to happiness and inner power

What to do?

- Fight vertical power with horizontal power by building alliances: green resistance movement—
- Ecosystem protection, indigenous rights, equity, anti-war movements
- Build community resilience
- Build trust by living with wisdom, integrity, courage, and compassion

Knowing others is intelligence,
knowing yourself is wisdom.
Mastering others is strength,
mastering yourself is true power.

— *Lao-Tzu*



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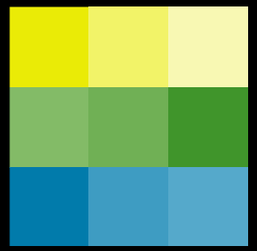

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