



Too clever by half but not nearly smart enough:

Why societal collapse is increasingly probable

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CaCoR Presentation

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Premise 1

- ❑ *H. sapiens* is not primarily a rational species.
- ❑ Passion and instinct often trump reason particularly in times of crisis.

Premise 2

- ❑ Human beings ‘socially construct’ their own realities.

More accurately:

- ❑ We construct conceptual lenses through which we perceive reality (e.g., political ideologies, religious doctrines, scientific models, economic paradigms, cultural narratives, etc.)

P₂ Corollaries

- ❑ The conceptual lenses through which we perceive reality determine the kind of reality we perceive.
- ❑ Potential problem: people live ‘out of’ their constructed realities **as if they were real.**

Premise 3 (Cyberneticists' creed)

- “We cannot regulate our interaction with any aspect of reality that our model of reality does not include”
(Stafford Beer).

P₃ Corollaries

- ❑ “When the variety or complexity of the environment exceeds the capacity of a [regulatory] system – natural or artificial – the environment will dominate and ultimately destroy that system.”
(Ross Ashby)
- ❑ A social construct or model is more likely to succeed the closer it ‘maps’ to any external biophysical reality it purports to represent.

Now consider this

- ❑ Climate change is *not* the major problem facing society today.
- ❑ Thinking ‘climate change’ as the primary existential threat reflects modern *H. sapiens*’ limited capacity to cope with complexity.
- ❑ This is mechanistic Cartesian reductionism at play.

Why problematic?

It's not the problem and we cannot 'solve' climate change by focusing on climate change.

Climate change is merely a symptom of *ecological overshoot*

The human enterprise is using resources and generating wastes in excess of the regenerative and assimilative capacities of the ecosphere.

Some other symptoms of *overshoot* (excess economic scale)

- ❑ the oceans are acidifying
- ❑ fresh waters are toxifying
- ❑ the seas are over-fished
- ❑ soils are eroding
- ❑ deserts are expanding
- ❑ tropical forests are shrinking
- ❑ biodiversity is plummeting (etc., etc.).

Meanwhile, income gaps widen even as global wealth accumulates.

Overshoot: The Global Picture



2017 human eco-footprint:

20.9 billion hectares (2.8 gha/cap)

2017 global biocapacity:

12.0 billion hectares (1.6 gha/cap)

= **73% OVERSHOOT**

Data source: Global Footprint network (2021)

Humans are consuming/dissipating/displacing other species, ecosystems, soils, etc., faster than nature can regenerate and dumping wastes beyond nature's capacity to assimilate.

Causal factor 1

Base nature (genetic predisposition)

- ❑ Unless or until constrained by negative feedback, *H. sapiens*, like all other species/populations tend to:
 - ❑ *expand to occupy all accessible habitat*
 - ❑ *use all available resources (in the case of humans “availability” is constantly being redefined by technology)*

In effect, *H. sapiens* is programmed to be unsustainable by nature.

Humans are just like other species

“Tool-wielding monkeys push local shellfish to edge of extinction”

New Scientist 19 Sept 2017



Causal factor 2

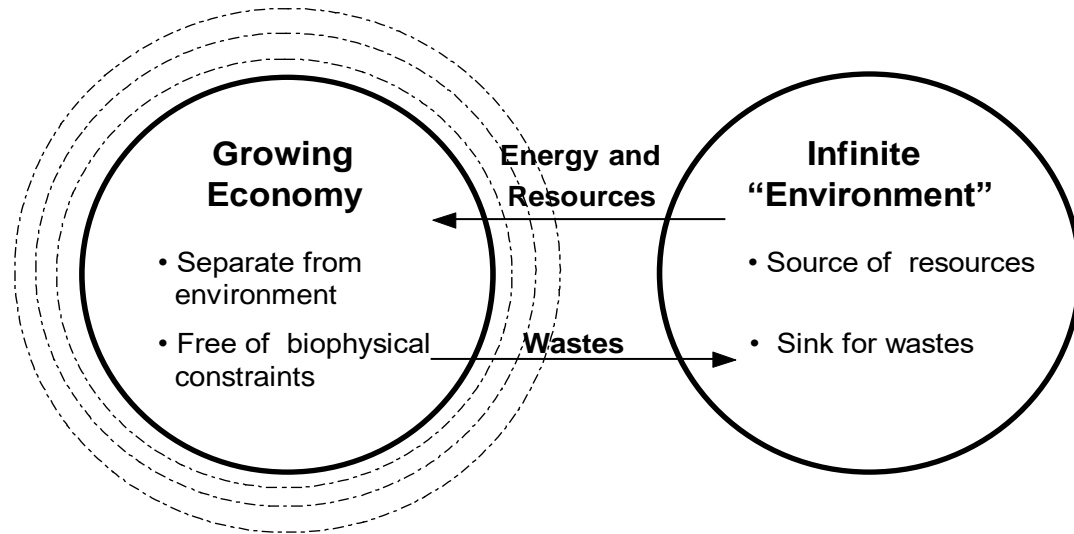
Cultural nurture – the social (mis)construction of reality

- ❑ The dominant narrative of modern techno-industrial (MTI) society is neoliberal economics. Some assumptions:
 - ❑ the economy is separate from and essentially independent of the biophysical ‘environment’.
 - ❑ human ingenuity (technology) can create substitutes for any potentially limiting natural resource.
 - ❑ ethical and moral considerations are irrelevant to economic analysis; damage to ecosystems or communities are mere ‘externalities.’

Neoliberal economics reflects

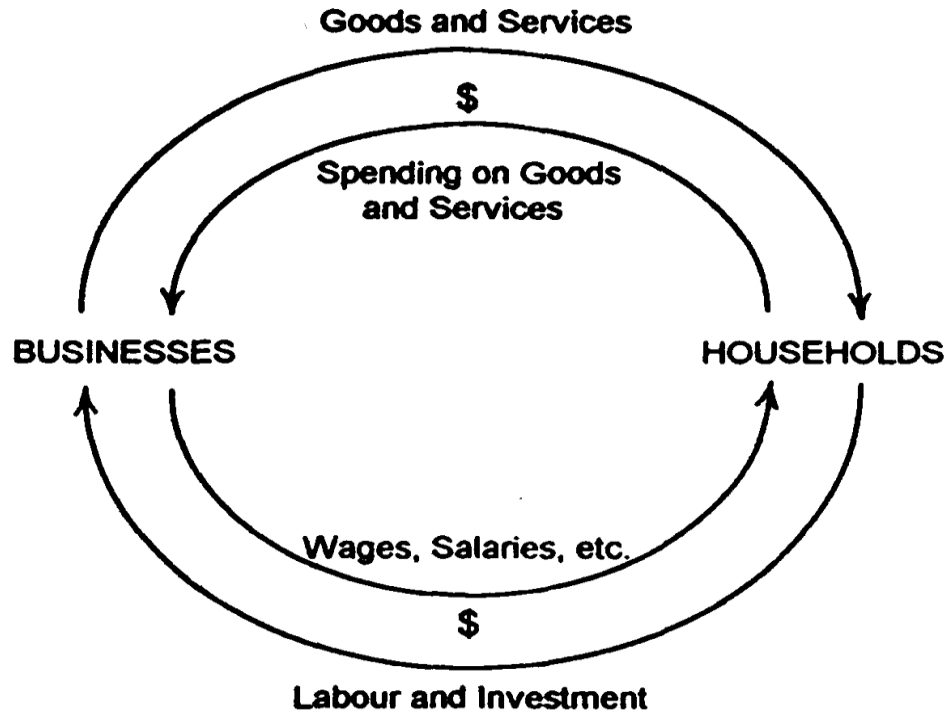
Human exceptionalism

(a social construct that exempts humans from natural laws)



Expansionists treat the economy as an open, growing, independent system lacking any fundamentally important "connectedness" to an infinite environment.

The *abstract* circular flows model: Economic perpetual motion



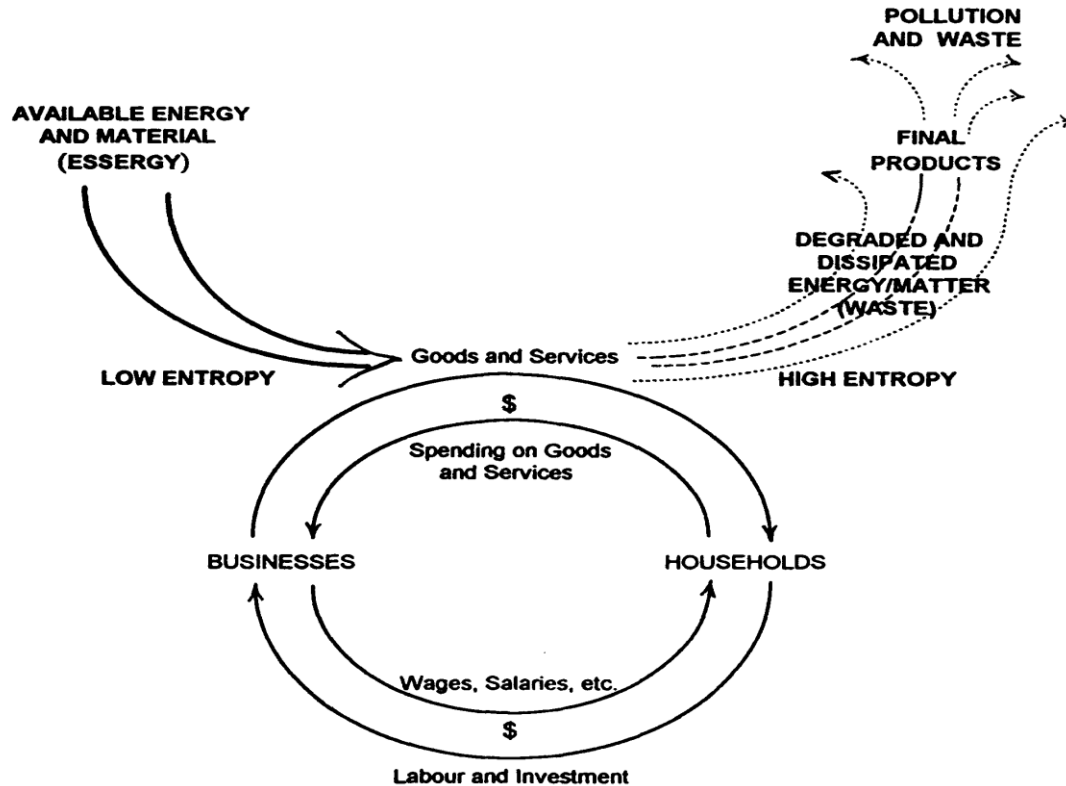
It follows from prevailing economic logic that:

- ❑ **Economic growth can continue indefinitely, propelled by boundless technological progress:**
 - ❑ *“We have in our hands now... the technology to feed, clothe, and supply energy to an ever-growing population for the next seven billion years...”* (J. Simon 1995).

The missing biophysical reality

- ❑ *All* human actions, indeed real events are *dissipative*. That is:
 - ❑ every activity results in the permanent dissipation (irreversible loss) of **all of the energy** and a **significant proportion of the material** involved.
 - ❑ The important flows in the economy are not the circular flows of abstract money value but the unidirectional flows of energy/matter.

Energy and material flows: unidirectional and irreversible throughput on a finite planet

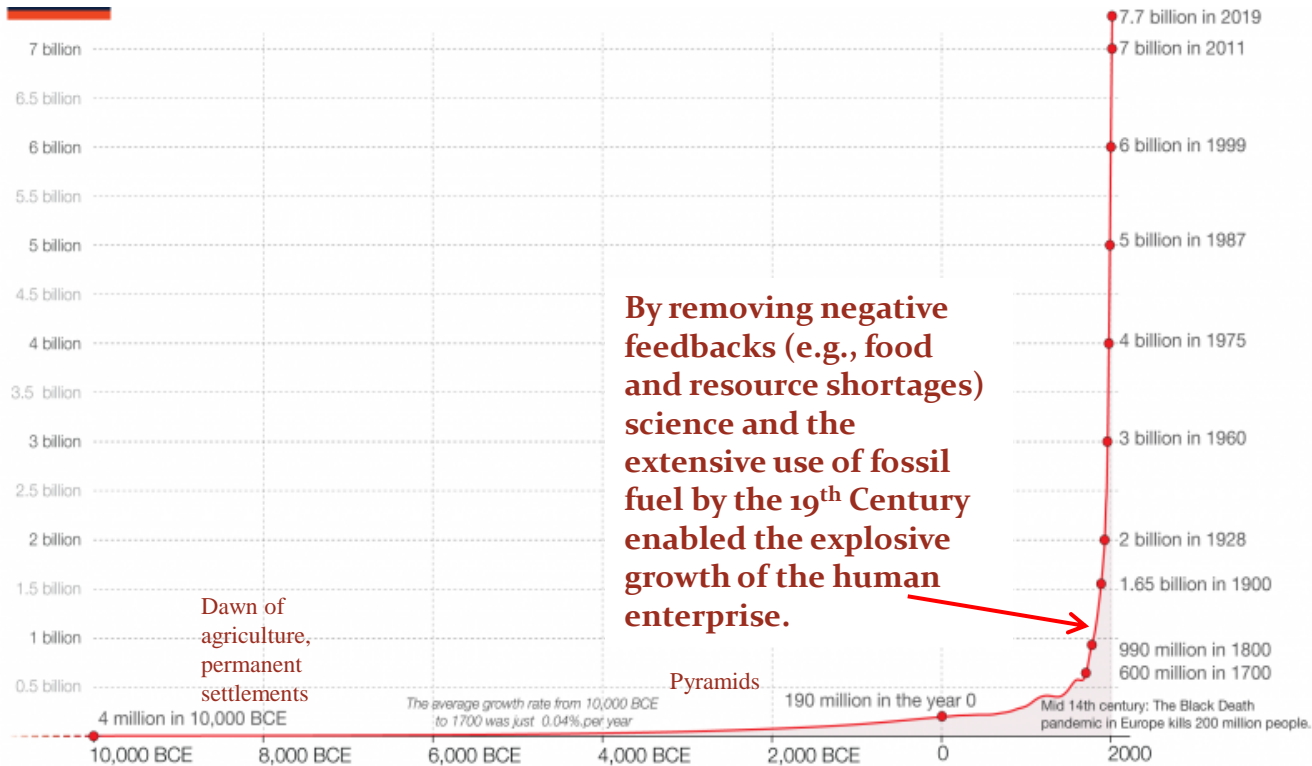


Base nature + modernist nurture = A mind-blowing rate of geometric growth

- ❑ It took ~350,000 years for the human population to hit one billion in the early 1800s.
- ❑ The population expanded an additional seven-and-a-half-fold in the next 200 years – **1/1700th as much time!** We reached 7.8 billion in 2020.
- ❑ Meanwhile, real gross world product increased >100-fold and per capita incomes (consumption) increased by a factor of 13 (25 in rich countries).

Problem: Earth didn't get any larger.

The exponential growth of the human enterprise: fueled by fossil energy



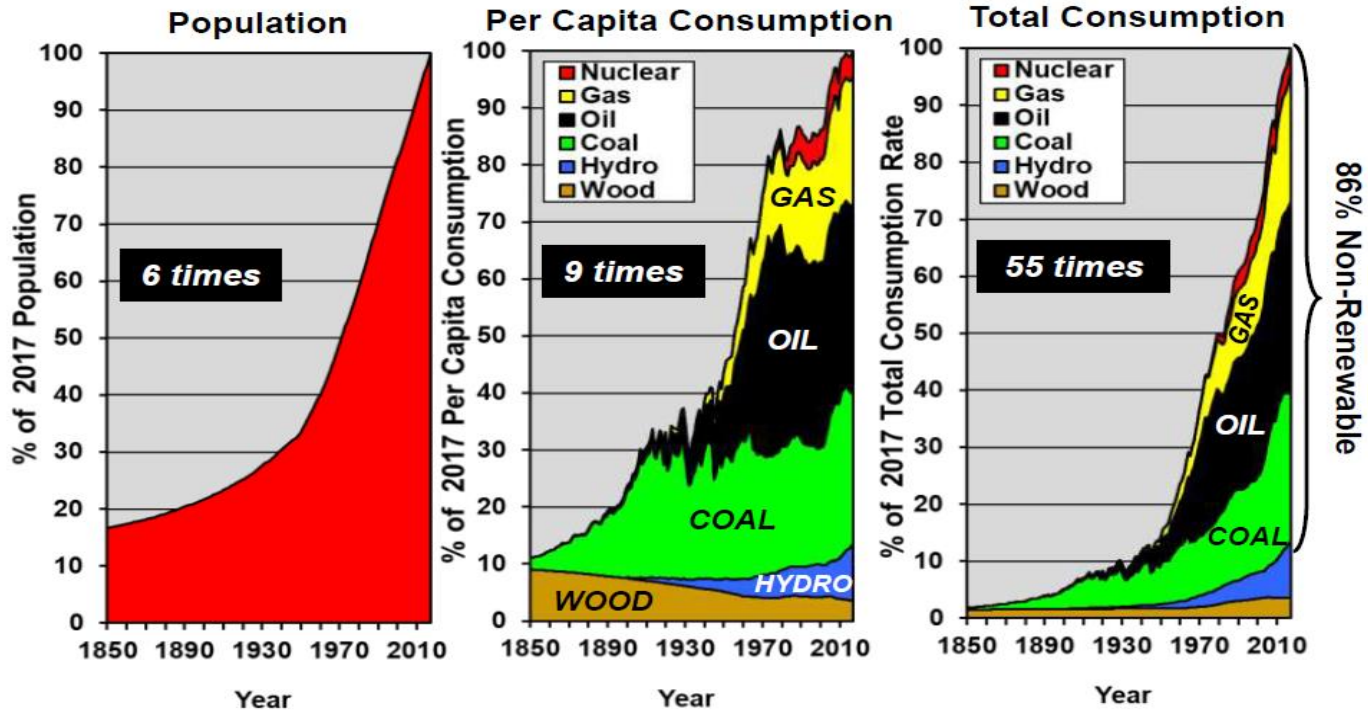
Continuous population and economic growth is an *anomaly*. The growth spurt that recent generations take to be the norm is *the single most abnormal period of human history*.

Based on estimates by the History Database of the Global Environment (HYDE) and the United Nations. On [OurWorldInData.org](https://www.OurWorldInData.org) you can download the annual data.

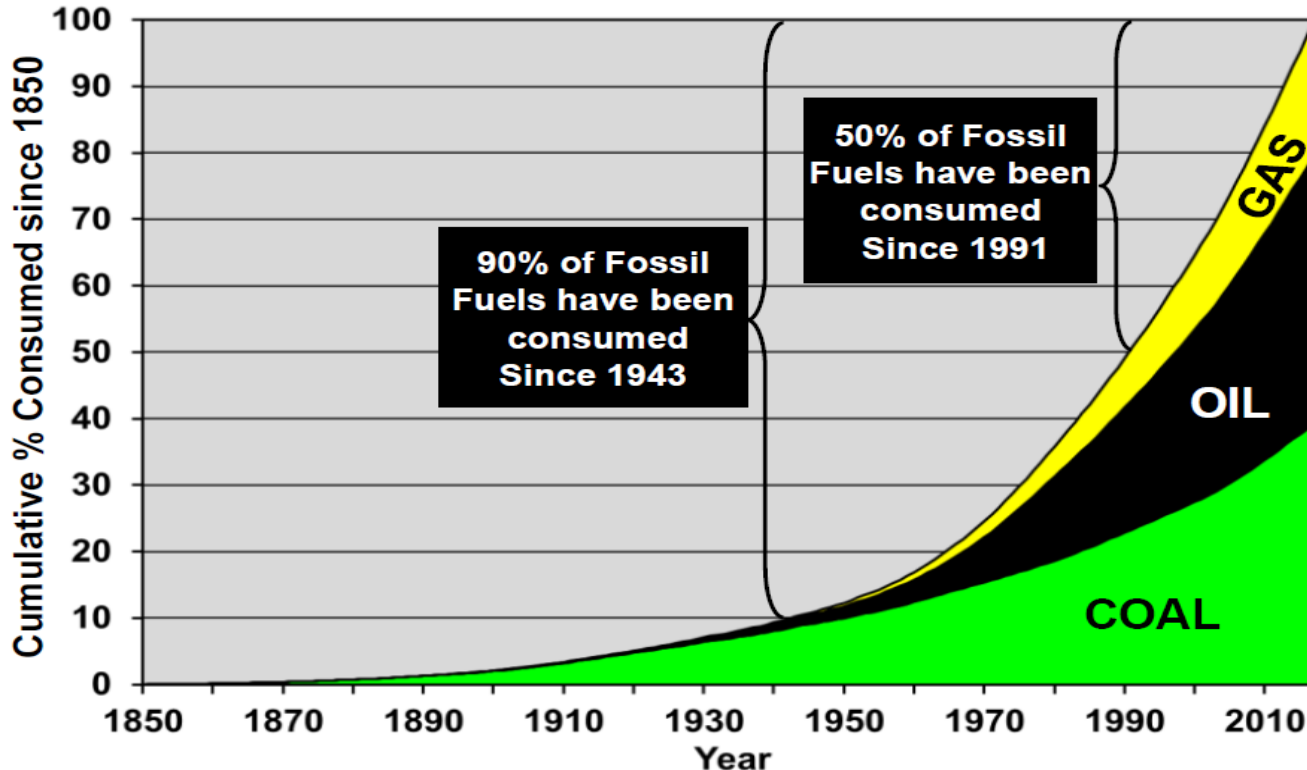
This is a visualization from [OurWorldInData.org](https://www.OurWorldInData.org), where you find data and research on how the world is changing.

Licensed under [CC-BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) by the author Max Roser.

Population, *per cap* and total energy consumption, 1850 - 2017



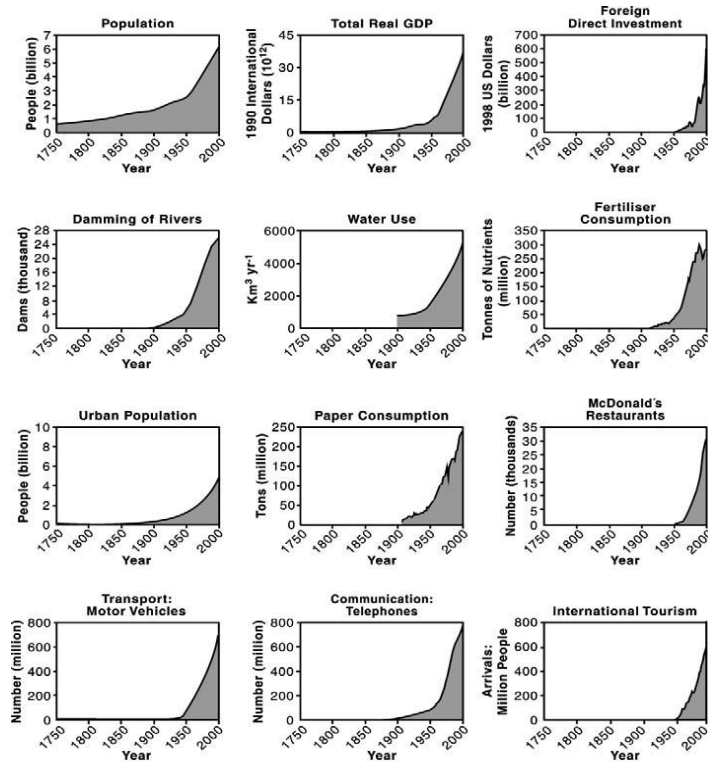
Cumulative consumption of fossil fuels, 1850 through 2017



3583 Billion barrels
Oil Equivalent

- ❑ Half the fossil fuels and many other resources ever used by humans have been consumed **in just the past 30 years.**
- ❑ *Climate change anyone?*

Consumption of everything else has exploded accordingly



- Contrary to received wisdom, techno-efficiency *promotes* consumption: the recent explosion of consumption (and pollution) has occurred during a period of *unprecedented increases in technological and economic efficiency.*

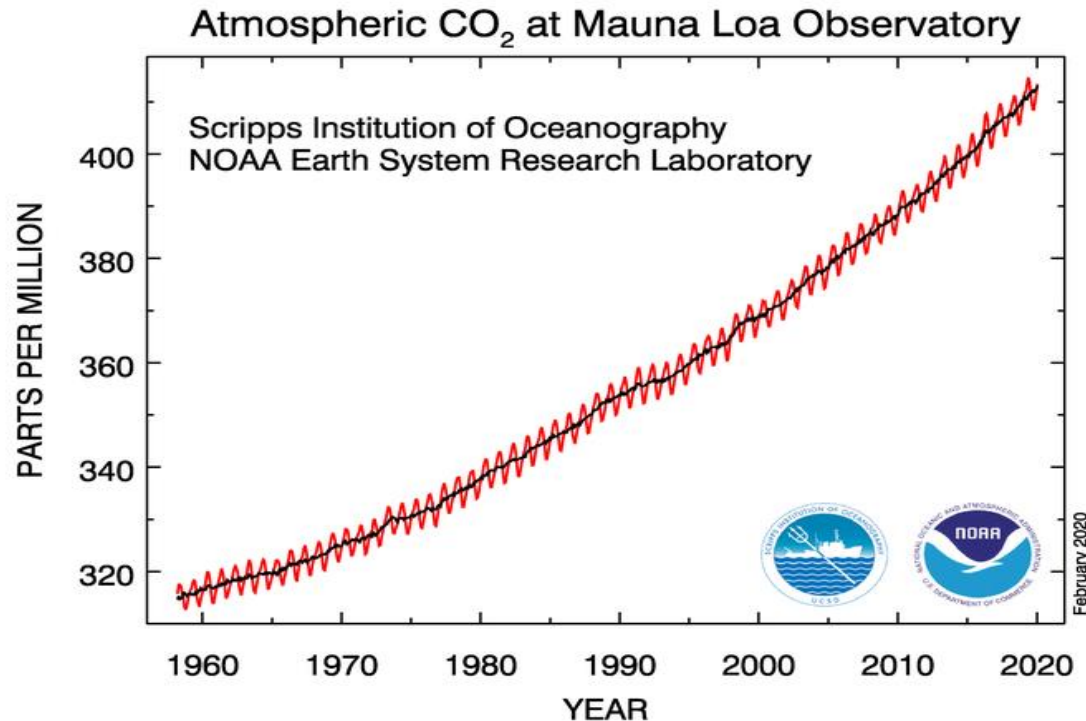
Economics: divorced from biophysical and social reality

- ❑ Mainstream economic models (social constructs all) *contain no useful information* about the structure or dynamic properties – interdependence, lags and thresholds, discontinuous behaviors, irreversibilities and limits – of the ecosystems, or even the social systems, *within which* the economy operates in the real world.

What could possibly go wrong?

Plenty as it turns out –

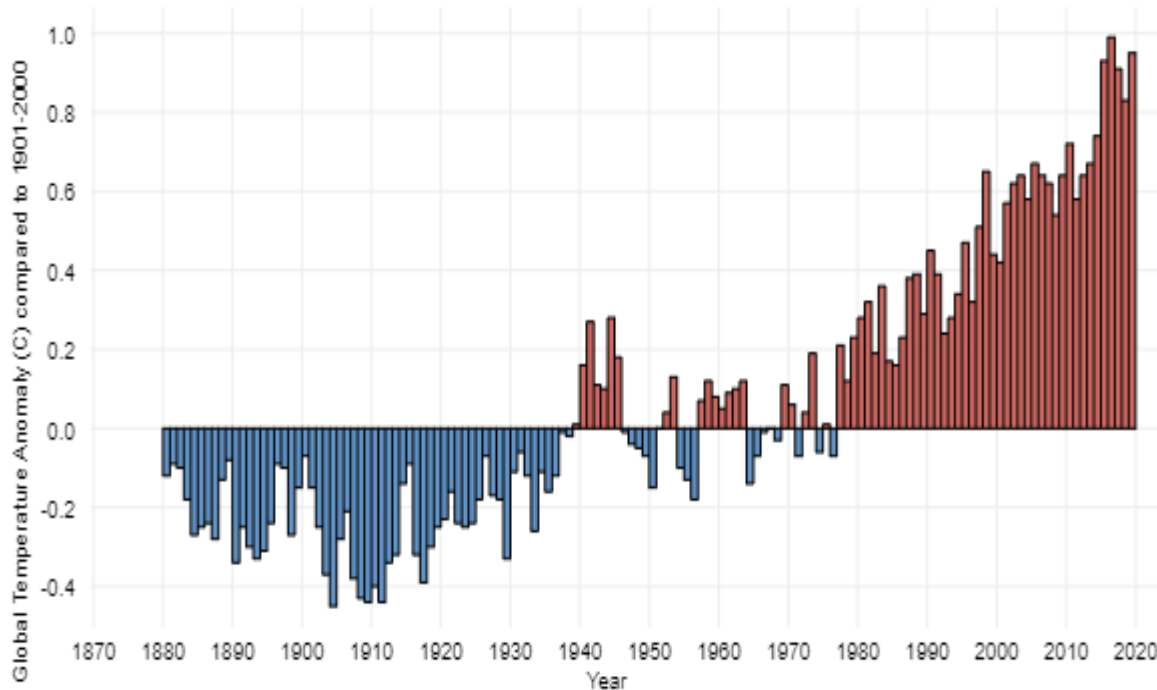
Best-known symptom of overshoot: Increasing atmospheric carbon dioxide and climate change



□ A 45% increase above pre-industrial levels to date. Humans are changing the chemistry of the ecosystem.

Global surface temp since 1880

(relative to 1901-2000 average)

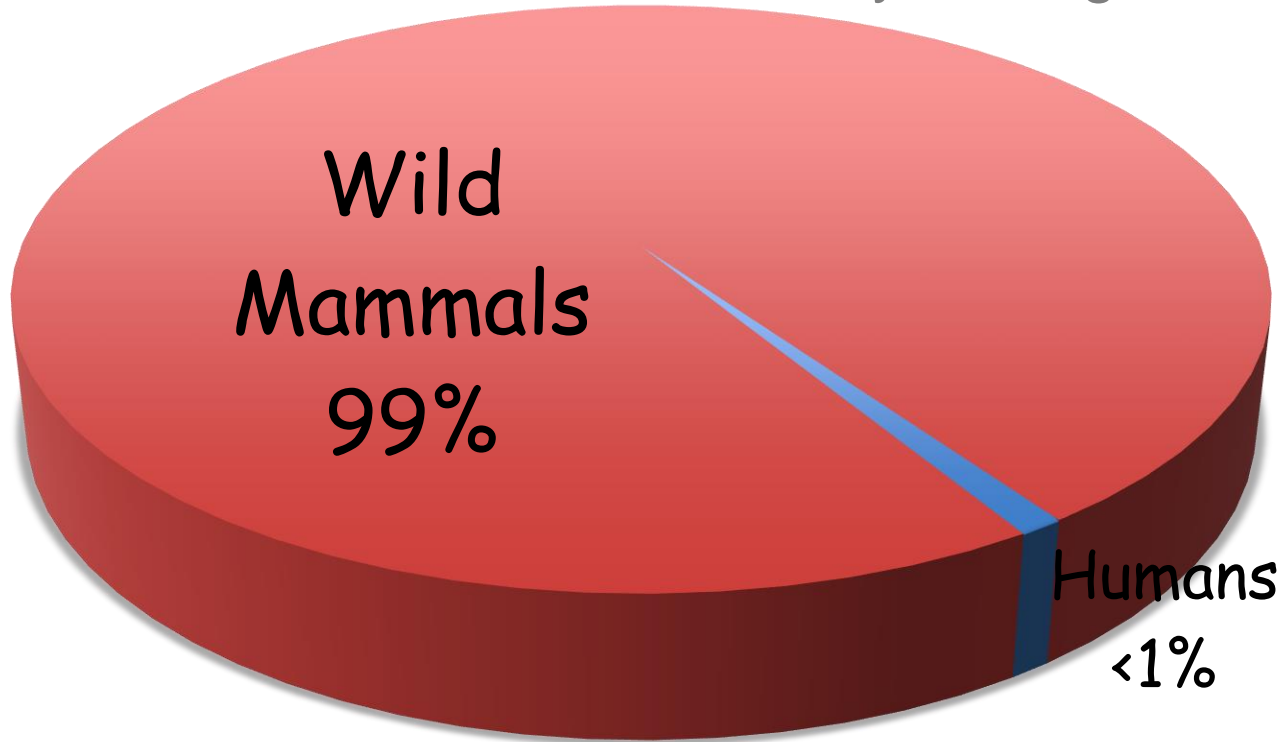


Breaking news

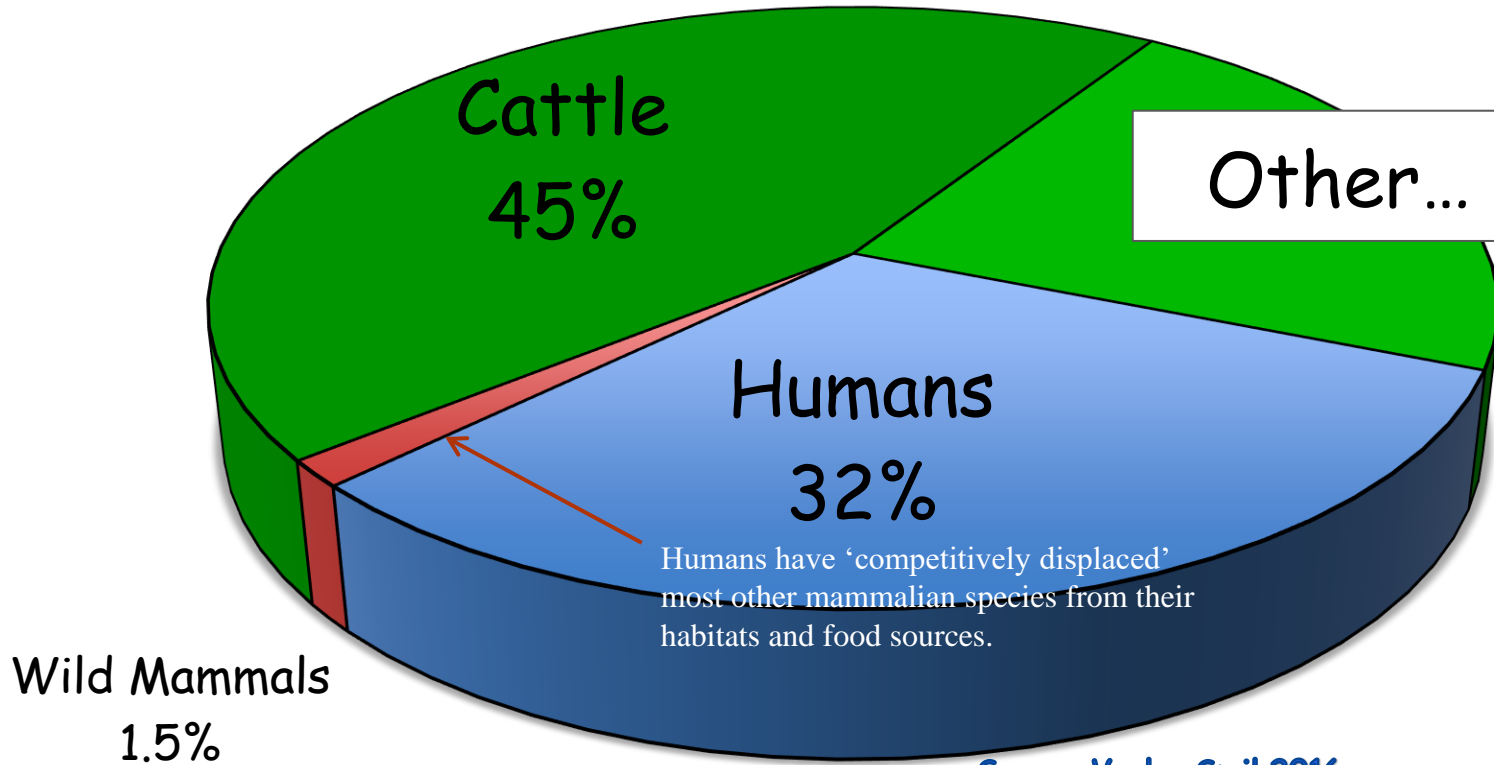
- ❑ 2020 tied with 2016 as the warmest year in the instrumental record.
- ❑ The past seven years are the warmest seven years on record.

Lesser-known symptom: competitive displacement of non-human species

Terrestrial Biomass 10,000 years ago



Terrestrial Mammal Biomass Today



Humans have 'competitively displaced' most other mammalian species from their habitats and food sources.

Source Vaclav Smil 2016

It's not just mammals

- ❑ Wild bird populations are also tumbling.
(Domestic poultry now constitute 70% of the world's avian biomass.)
- ❑ Average populations of thousands of monitored species of wild vertebrates (birds, fish, mammals, amphibians) have declined ~60 percent since 1970.
- ❑ Populations of invertebrates, including essential pollinators, are also in free-fall: Butterflies down 53%; beetles down 49%; bumblebees down 46%.

Some social constructs are little more than shared illusions

- ❑ Contrary to conventional political wisdom, **there is an absolute conflict between the growth of the human enterprise and protection/conservation of ‘the environment’.**
- ❑ The continuous growth of the human enterprise on a finite planet *necessarily* means the displacement of non-human species.

Modern humans are systematically destroying the biophysical basis of their own existence.

The MTI ‘solution’ to the ecological crisis is completely **self-referencing**: More growth through technology

Example 1 – the population problem:

- ❑ Population planning has declined from being the dominant policy lever discussed in 1969 to the *least* researched in 2018.
- ❑ “We find a strong and increasing focus on feeding the world through increasing food production *via technology*...” (Tamburino *et al.* 2020, emphasis added).

Example 2 – climate change

To avoid potentially catastrophic climate change the Paris accord suggests we must:

- ❑ reduce CO₂ emissions by ~ 50% below 2010 levels by 2030 (i.e., 7% per year beginning now).
- ❑ achieve complete decarbonization by 2050.
(More recent studies suggest we must decarbonize by 2030.)

Politically acceptable ‘solutions’

- ❑ Any capital-intensive investment (e.g., wind and solar power) that will *maintain the existing growth-based economic order*.
- ❑ Serious conservation, demand reduction, life-style changes, more equitable distribution, etc., are not on the table.
- ❑ Disaster policy is being designed to serve the capitalist growth-based economy “...so the latter becomes the *solution to (not the cause of) the [problem]*” (Spash 2016, p.931).

Sometimes editorial cartoonists say it all



Continued growth actually impedes any 'green energy' transition (data for 2018-2019)

- ❑ Primary energy consumption is growing twice as fast as renewable energy production.
- ❑ Even in electricity where the most RE progress is being made, demand increased by **352 TWhr (1.3%)** but generation by non-hydro renewables increased by only **337 TWhr (13.6%)**.

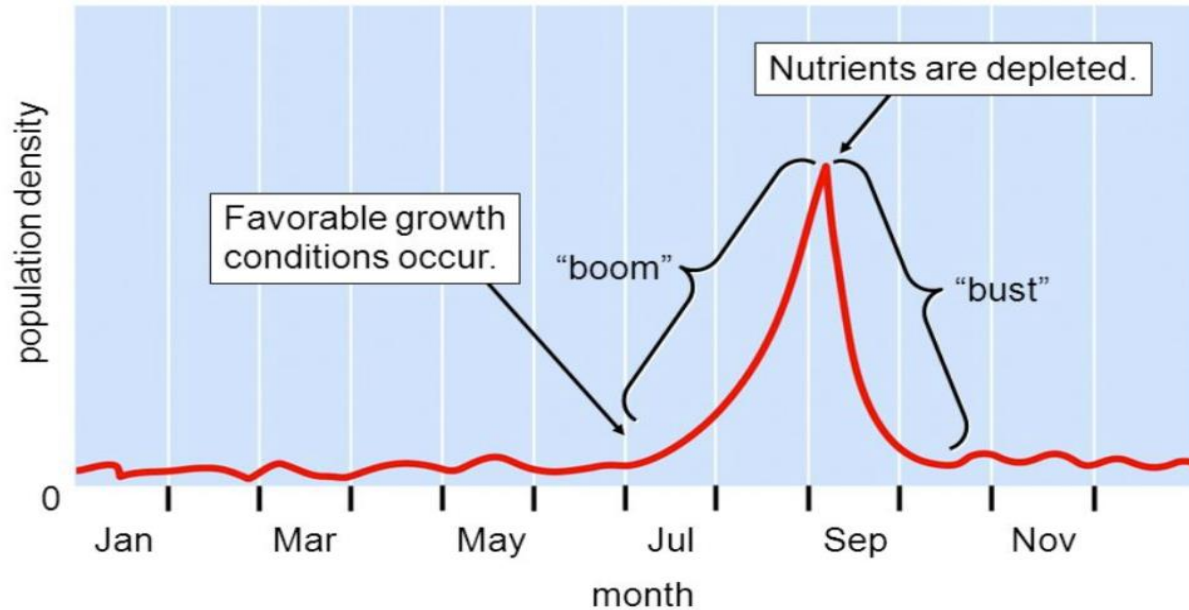
Bottom line: In 2018-2019 the world remained 84% dependent on fossil fuels

Biology Again

As matters stand, the expansion of the human enterprise resembles the ‘plague phase’ of a one-off boom/bust population cycle.

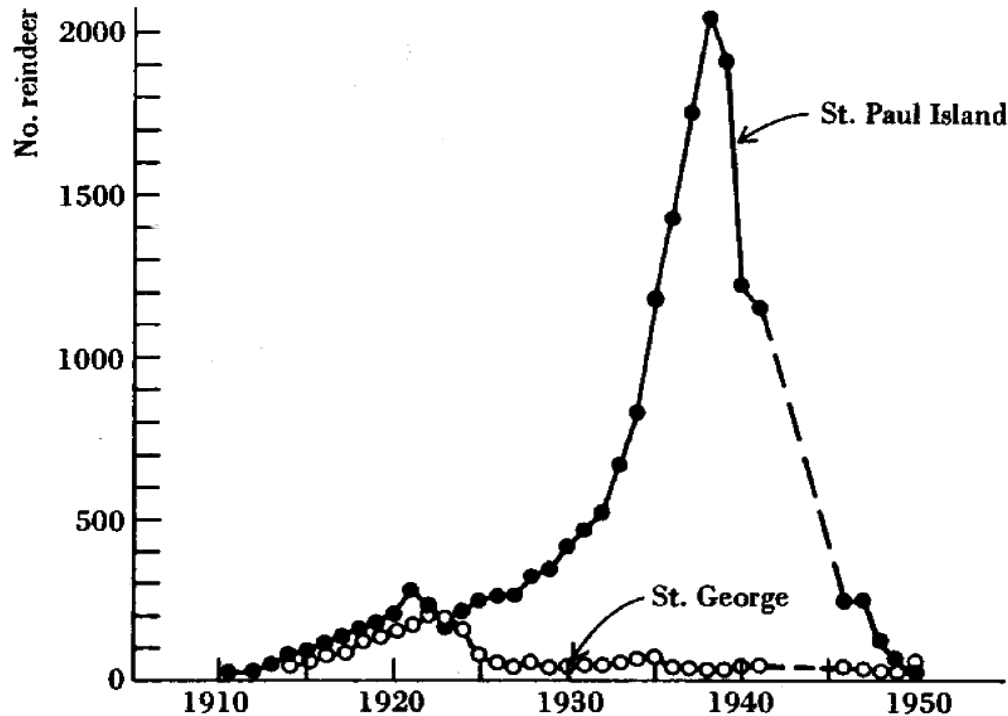
The 'boom-bust' population cycle

What goes up will come down!



(Source : *Biology – Life on Earth*, 8th ed, Fig.26-3)

The pattern is common to non-human species introduced to initially resource-rich ecosystems



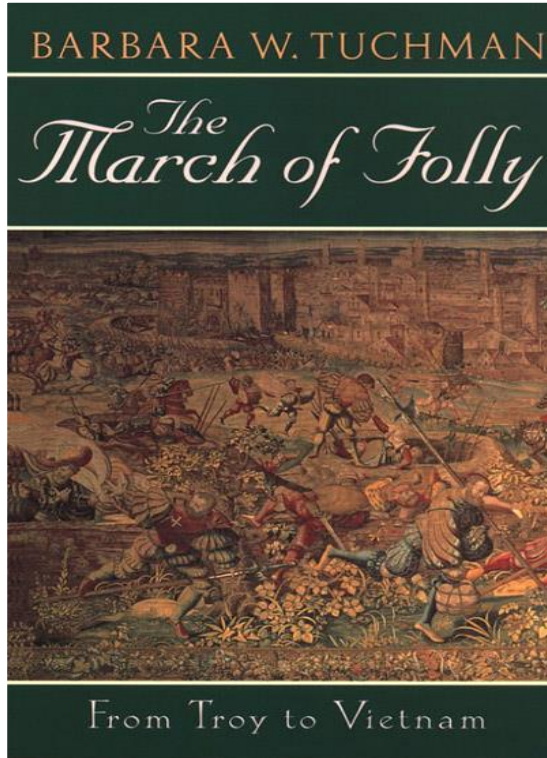
- Here we see the rise and fall of reindeer populations introduced to the Pribilof Islands.
- The population crashes resulted from resource depletion – in this case overgrazed lichens.

In theory, we should be able to avoid uncontrolled collapse

Unique qualities distinguish *H. Sapiens* from other species:

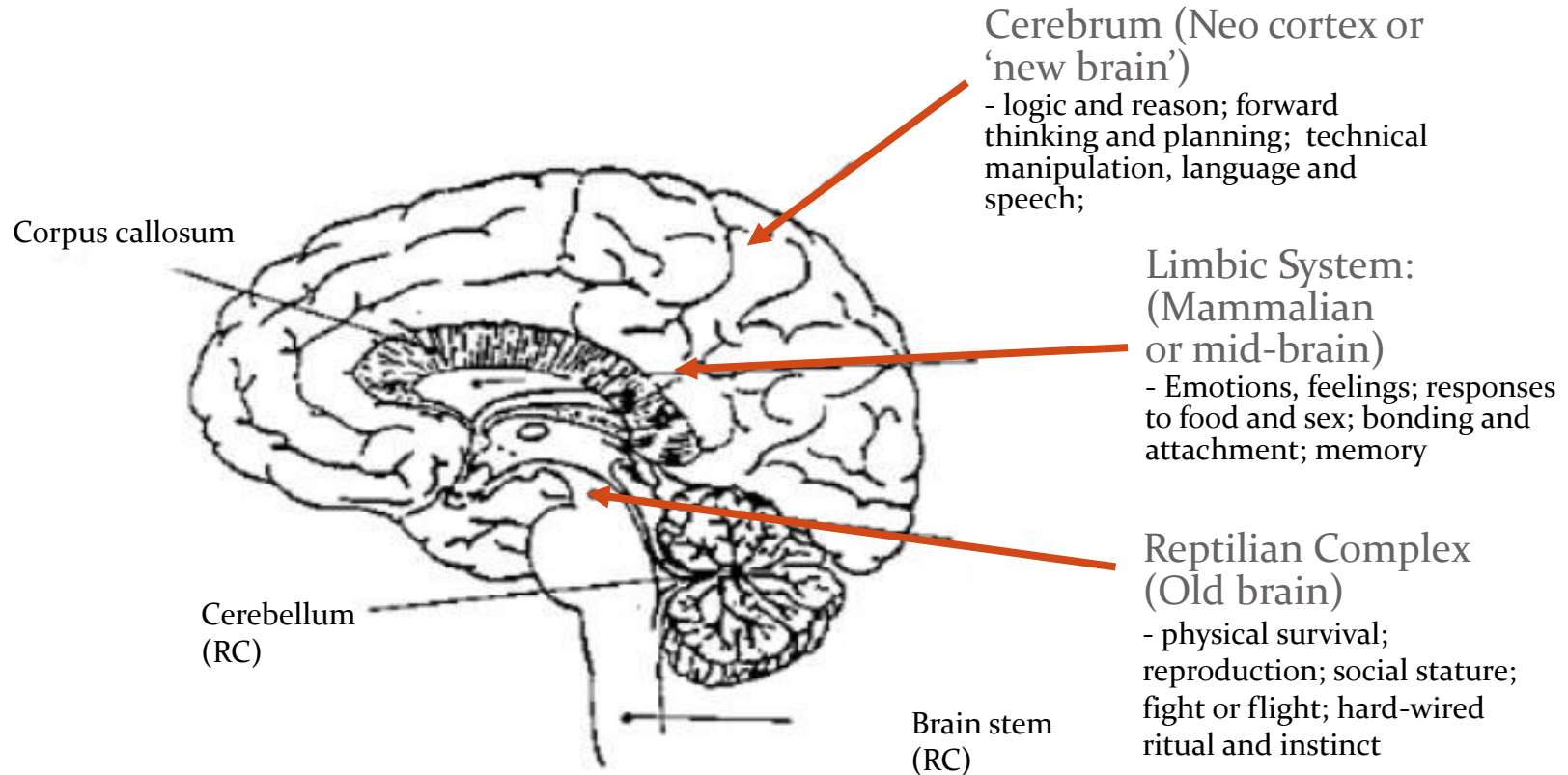
- ❑ high intelligence, (e.g. logical analysis, the ability to reason from the evidence).
- ❑ the ability to plan ahead.
- ❑ the capacity to exercise moral judgement.
- ❑ empathy/compassion for other people and other species.
- ❑ uniquely diverse forms and institutions for cooperative behaviour.

However, logic and reason are not the primary determinants of human affairs

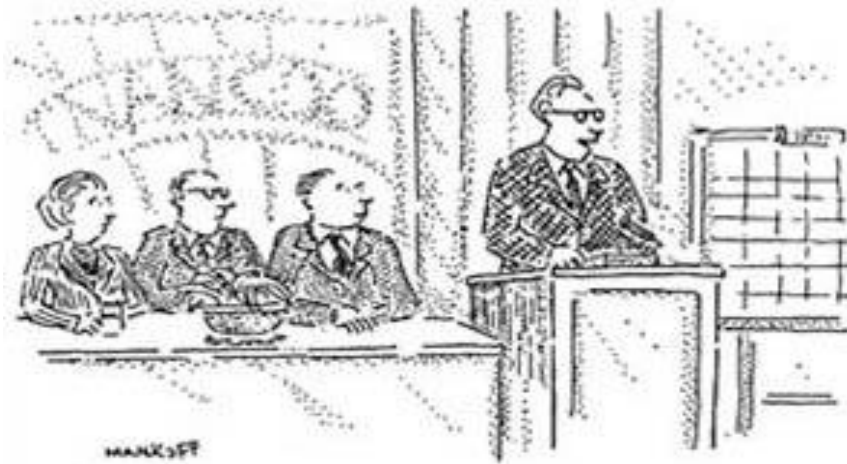


- ❑ “The masses have never thirsted after truth. They turn aside from evidence that is not to their taste, preferring to deify error, if error seduce[s] them. (Gustave le Bon 1896).
- ❑ “Wooden-headedness... plays a remarkably large role in government. It consists in assessing a situation in terms of preconceived fixed notions [i.e., ideology] while ignoring any contrary signs. It is acting according to wish while not allowing oneself to be deflected by the facts” (Tuchman 1984).
- ❑ “For us to maintain our way of living, we must... tell lies to each other, and especially to ourselves... [the lies] are necessary because without them many deplorable acts would become impossibilities” (Jensen 2000).

Confounded by our 'triune brains'?



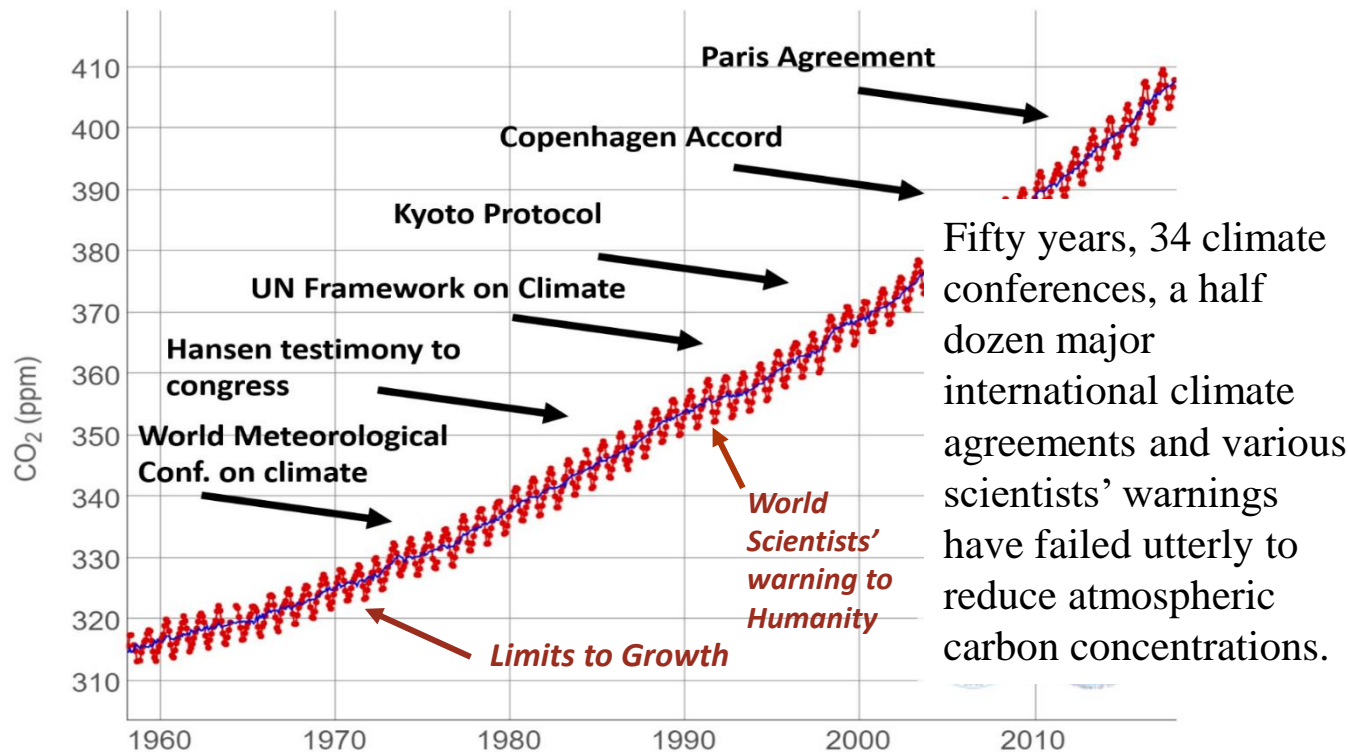
H. sapiens is a deeply conflicted Species

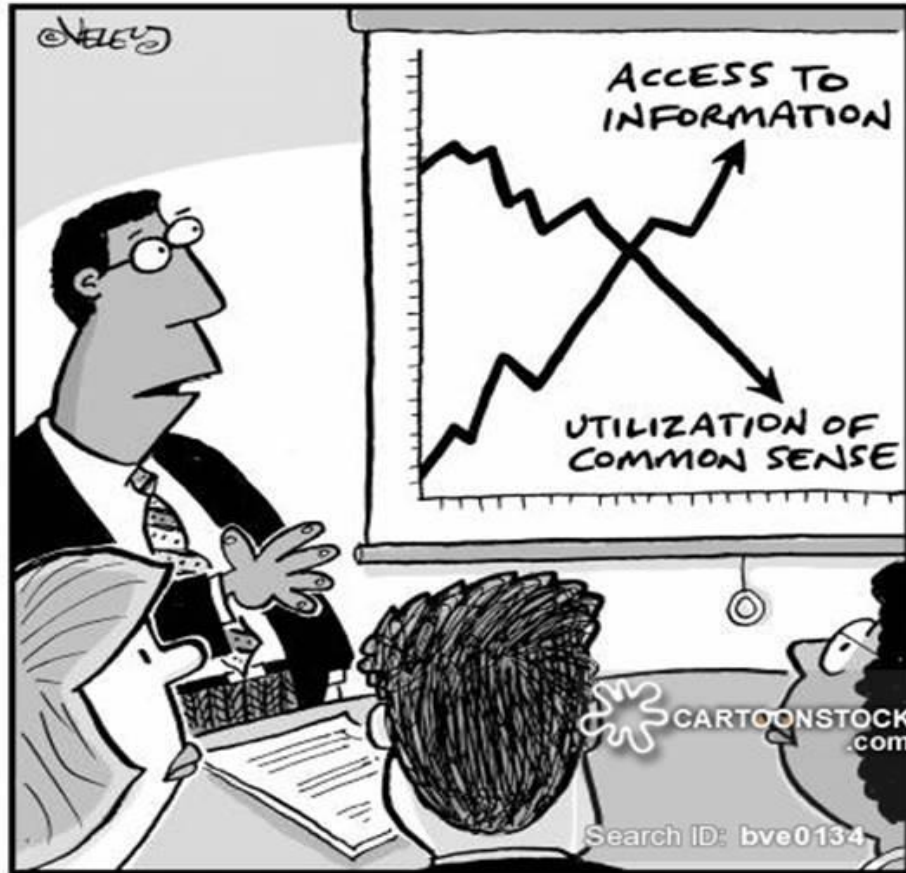


"And so, while the end-of-the-world scenario will be rife with unimaginable horrors, we believe that the pre-end period will be filled with unprecedented opportunities for profit."

Example: A brief history of scientists' warnings – we cannot even implement our own negotiated climate agreements

Mauna Loa Monthly Averages





“Assuming present trends continue, the odds are quite good that we’ll become the best-informed extinct species on the planet!”

An Explanatory Cognitive Mechanism



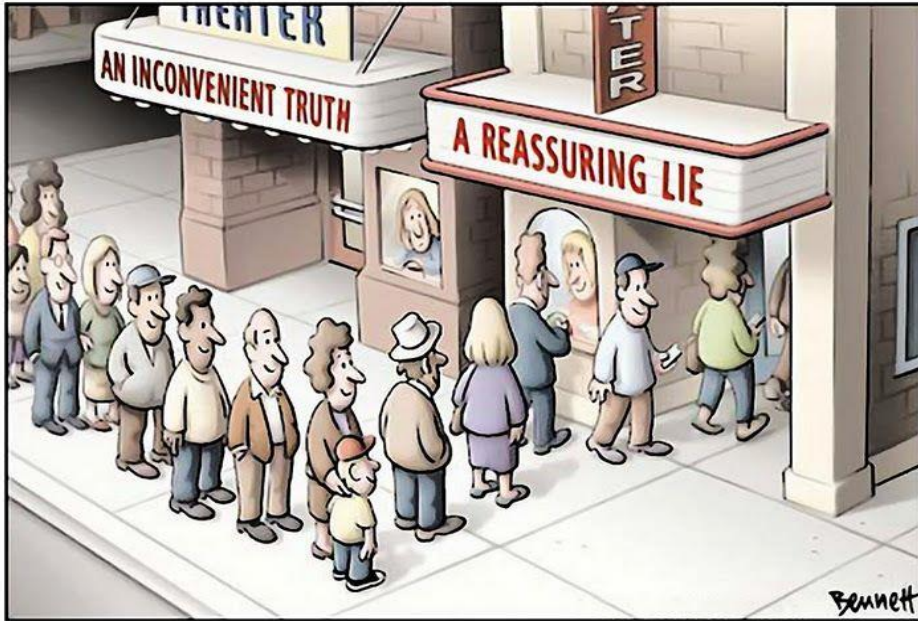
- ❑ During individual development, sensory experiences and constructed cultural norms literally help shape the human brain's synaptic circuitry in patterns that reflect and embed those experiences.
- ❑ Subsequently, people seek out *compatible* experiences and, **“when faced with information that does not agree with their [preformed] internal structures, they deny, discredit, reinterpret or forget that information”** (Wexler, *Brain and Culture*, 2006).

Or, to put it more simply



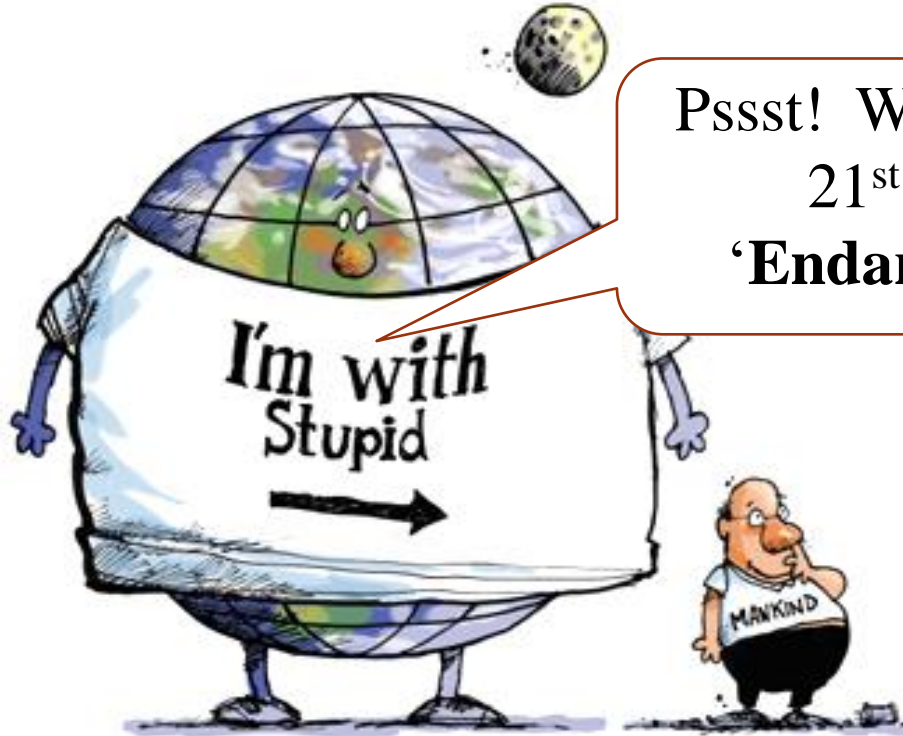
"The problem with your reasoned solutions is they don't fit my preconceived notions of the problems."

It gets worse: in recent decades, the population has been *socially engineered* to ignore reality



- ❑ Politics is increasingly influenced by neoliberal ideology, religious fundamentalism, climate-change denial, anti-intellectualism and other forms of ‘magical thinking’.
- ❑ The 2016 Oxford Dictionaries word-of-the-year was, **post-truth**, an adjective defined as ‘*relating to or denoting circumstances in which objective facts are less influential in shaping public opinion than appeals to emotion and personal belief.*’

This is a new 'age of unreason': Science denial and magical thinking



Pssst! Welcome to the
21st Century
'Endarkenment'!





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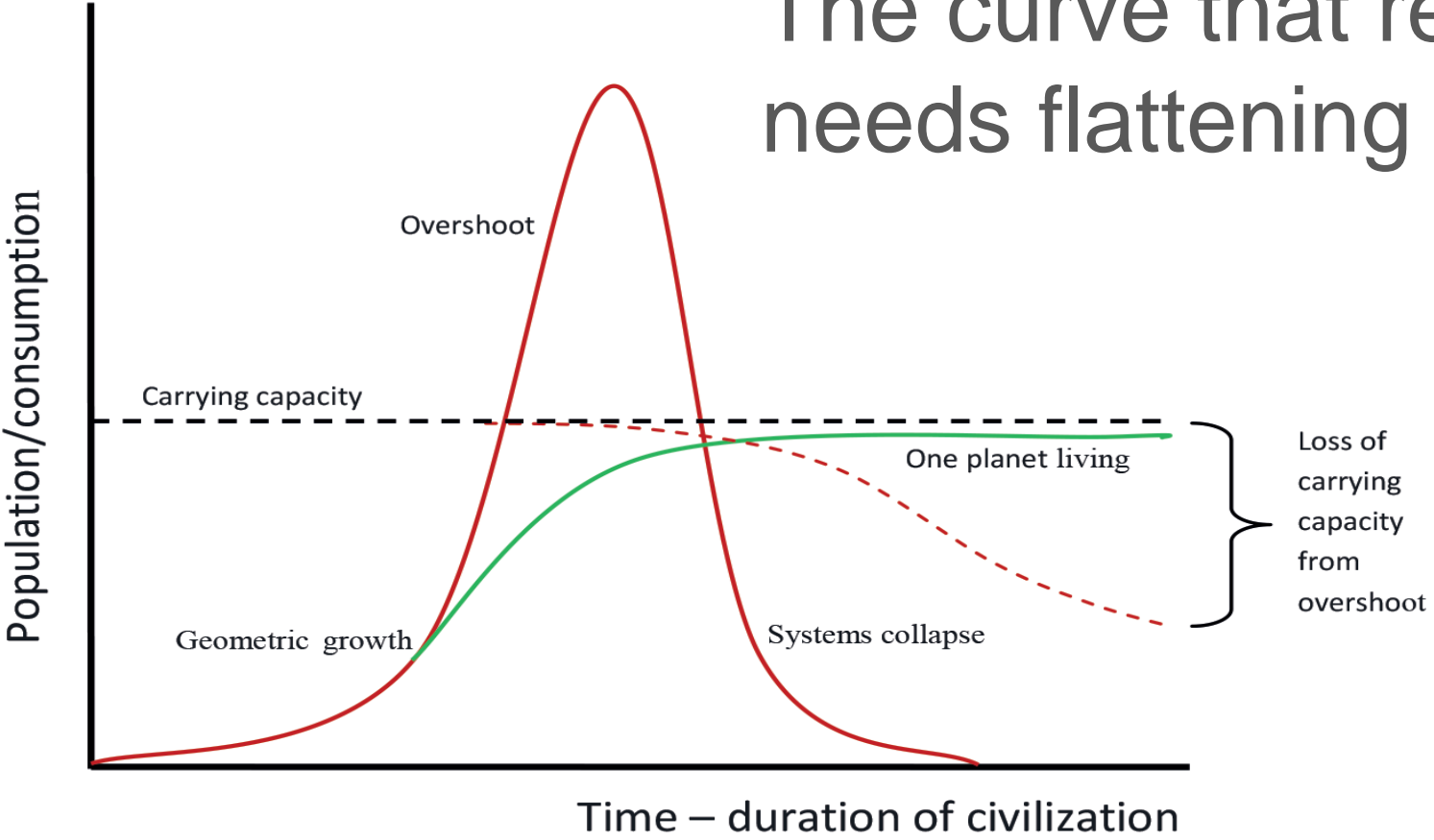
"It's an enduring mystery. How did this extinct species combine such huge brains with such jaw dropping stupidity?"

What modern techno-industrial culture refuses to acknowledge

To act consistently with our best science may well require a planned economic and population contraction.

Can humanity learn to live more equitably within the means of nature?

The curve that really needs flattening



The choice before us

- ❑ The human enterprise is in critical overshoot.
- ❑ We may be near – or beyond – a critical tipping point.
- ❑ In coming years, **the human enterprise *will* contract.**
- ❑ As an intelligent, plan-capable species we can theoretically choose between:
 - ❑ Business as usual – risking a chaotic implosion imposed by nature followed by geopolitical turmoil and resource wars (basically the current tack) or;
 - ❑ A well-planned, orderly and cooperative descent toward a socially just sustainability for all.

Required to eliminate overshoot (1)

- ❑ Formal recognition of the end of material growth and the need to *reduce* the human ecological footprint.
- ❑ Recognition of the theoretical and practical difficulties/impossibility of an all-green quantitatively equivalent energy transition.
- ❑ Acknowledgement that, as long as we remain in overshoot, **sustainable production/consumption means *less* production/consumption.**
- ❑ Assistance to communities, families and individuals to facilitate the adoption of sustainable lifestyles (even North Americans lived happily on half the energy per capita in the 1960s that we use today).
- ❑ Programs to retrain the workforce for new forms of employment.
- ❑ Strategies (e.g., taxes, fines) to eliminate unnecessary fossil fuel use and reduce energy waste (half or more of energy “consumed” is wasted through inefficiencies and carelessness)

Required to eliminate overshoot (2)

- ❑ Policies to restructure the global and national economies to remain within the remaining “allowable” carbon budget (there may be none)
- ❑ Processes to allocate the remaining carbon budget fairly (through rationing, quotas, etc.) to essential uses only, such as food production, space/water heating, inter-urban transportation.
- ❑ Plans to re-localize essential economic activity (de-globalization).
- ❑ Recognition that equitable sustainability requires fiscal mechanisms for income/wealth redistribution.
- ❑ On-going program to ensure the restoration of ecosystems and integrity of global life-support systems.
- ❑ A global population strategy to enable a smooth descent to the ~two billion that could live comfortably indefinitely within the biophysical means of nature.

In short

- ❑ We must transcend techno-modernism and catalyze a *personal-to-civilization-level transformation* to a way of being on Earth in which humans can live spiritually satisfying, economically secure lives more equitably within the means of nature.