

Waarom is Energietransitie nodig ?

Werkelijkheid 1.0



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Economic Research

www.EnergyAndStuff.org

vab  Vereniging
Agrarische
Bedrijfsadviseurs

Masterclass
Energietransitie in de Landbouw
Dronten, 21 Juni 2018

TALENT

SECURITY



CARBON

RESOURCES

TECHNOLOGY

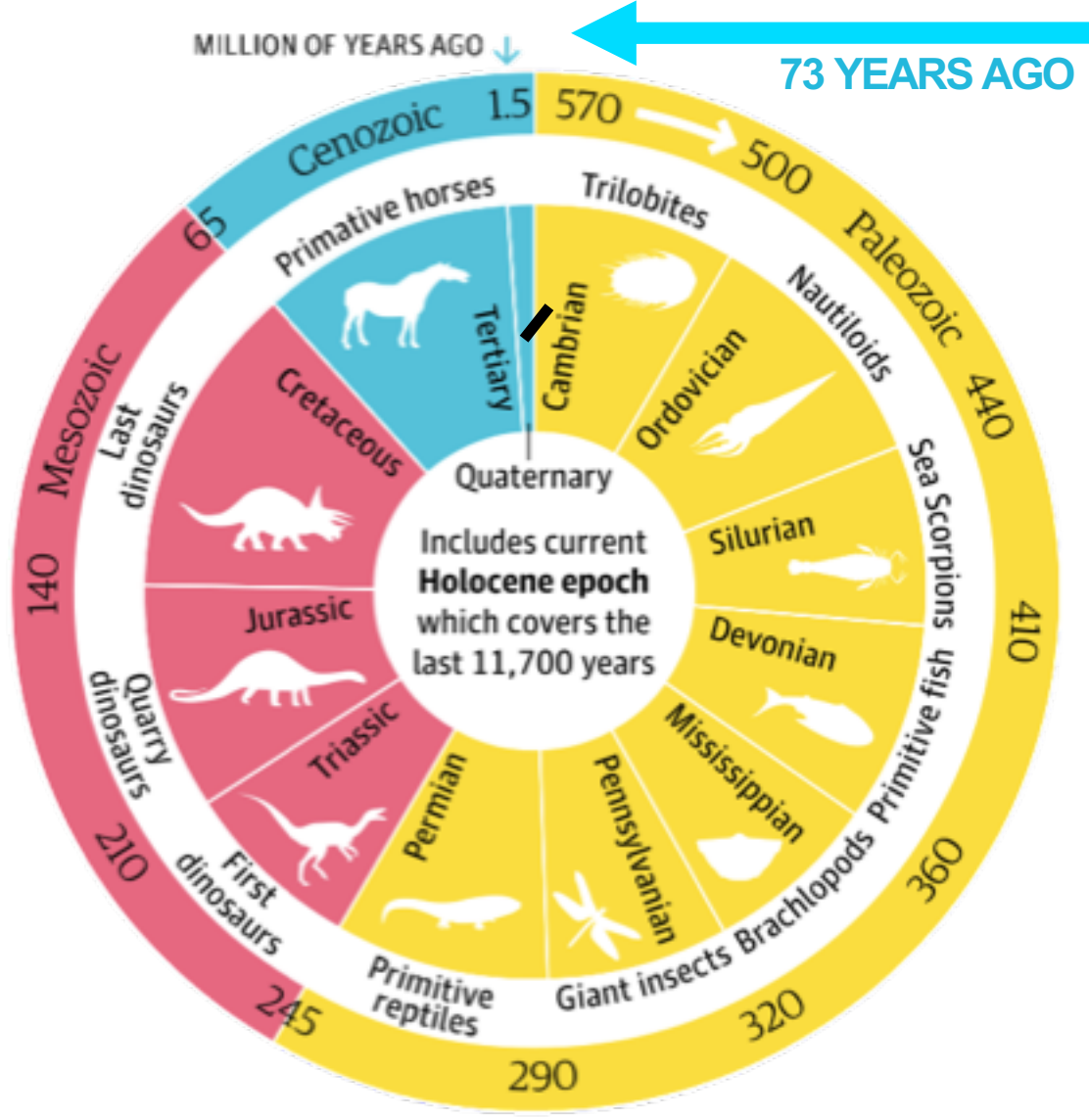
ENERGY



<https://www.youtube.com/embed/0vBzxC9eooq>

- Wanneer begon fotosynthese/plantgroei?
- Hoe lang bestaan onze soort Homo Sapiens?
- Hoe lang waren de Dinosaurussen hier?
- Hoe lang bedrijven we Landbouw?

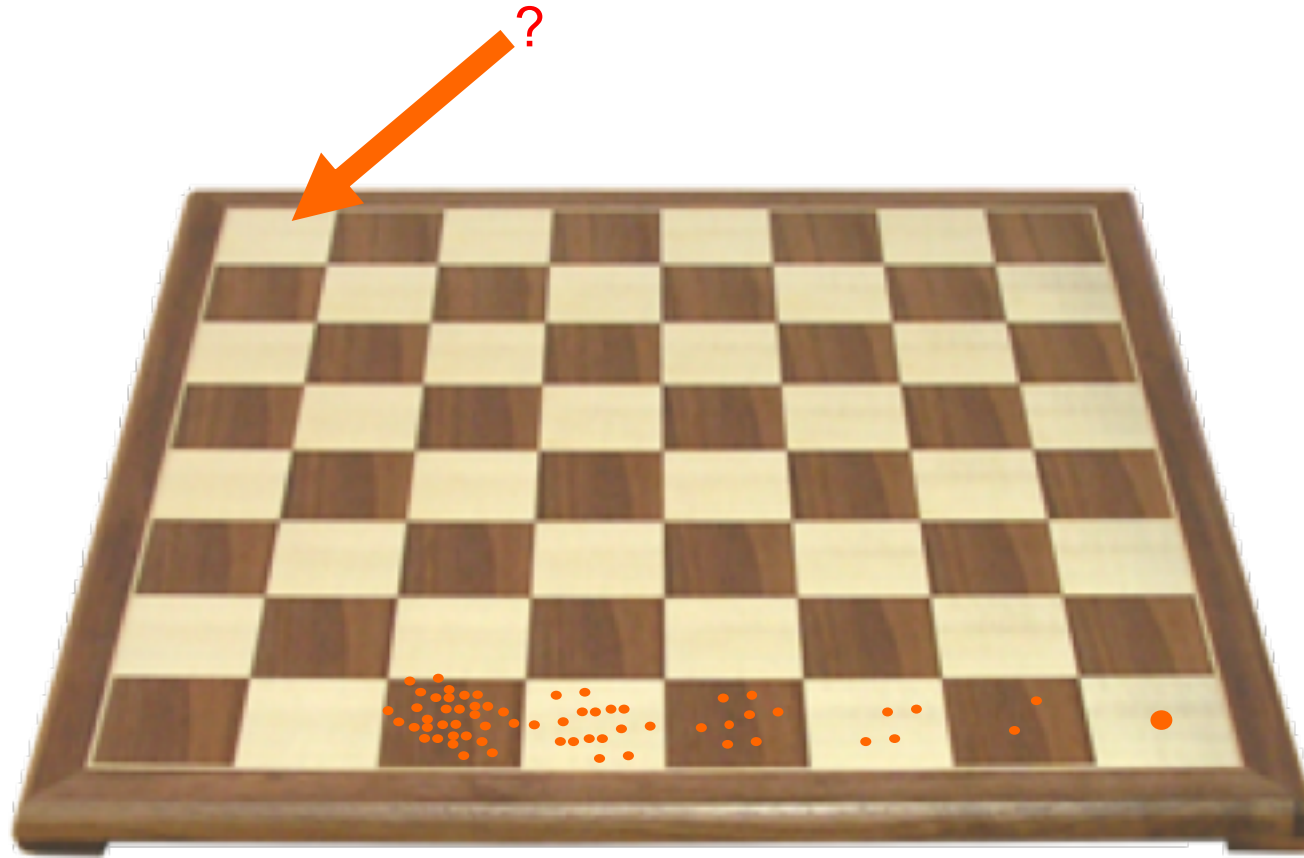
Geological periods 570m years ago to the present



Los Alamos
16 July 1945:
 start of
Antropocene

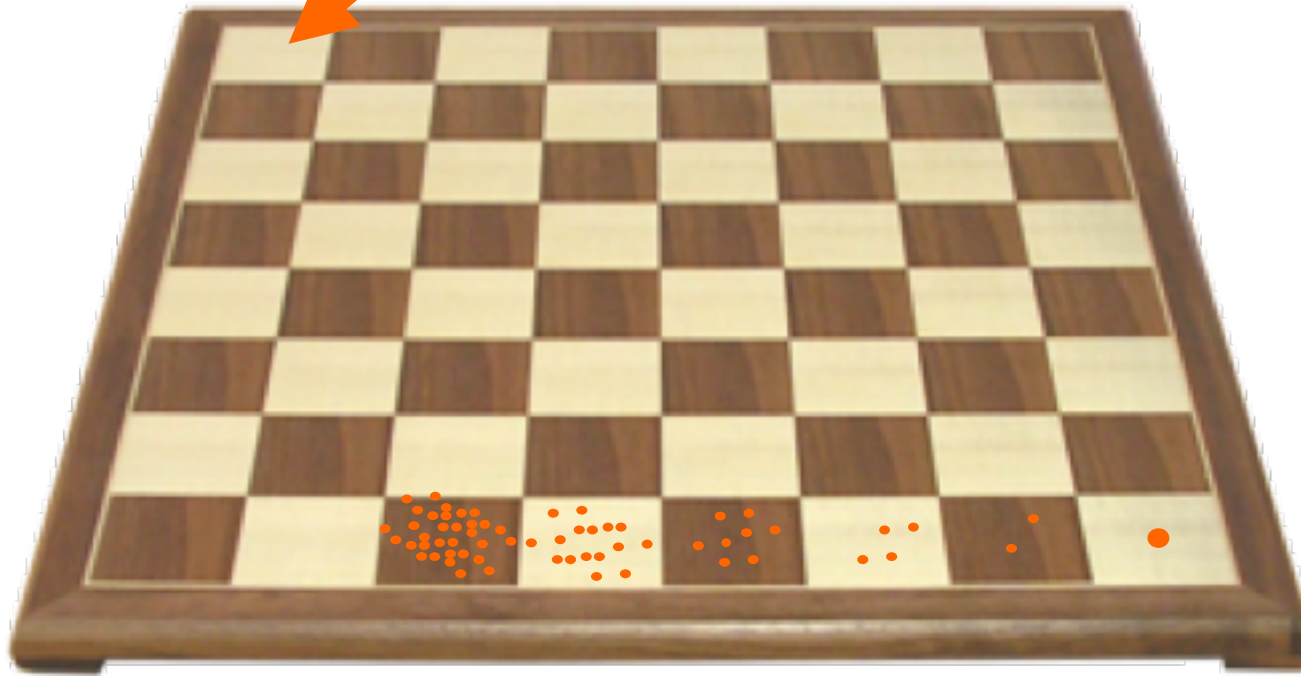


De Sage van de Koning van Persië

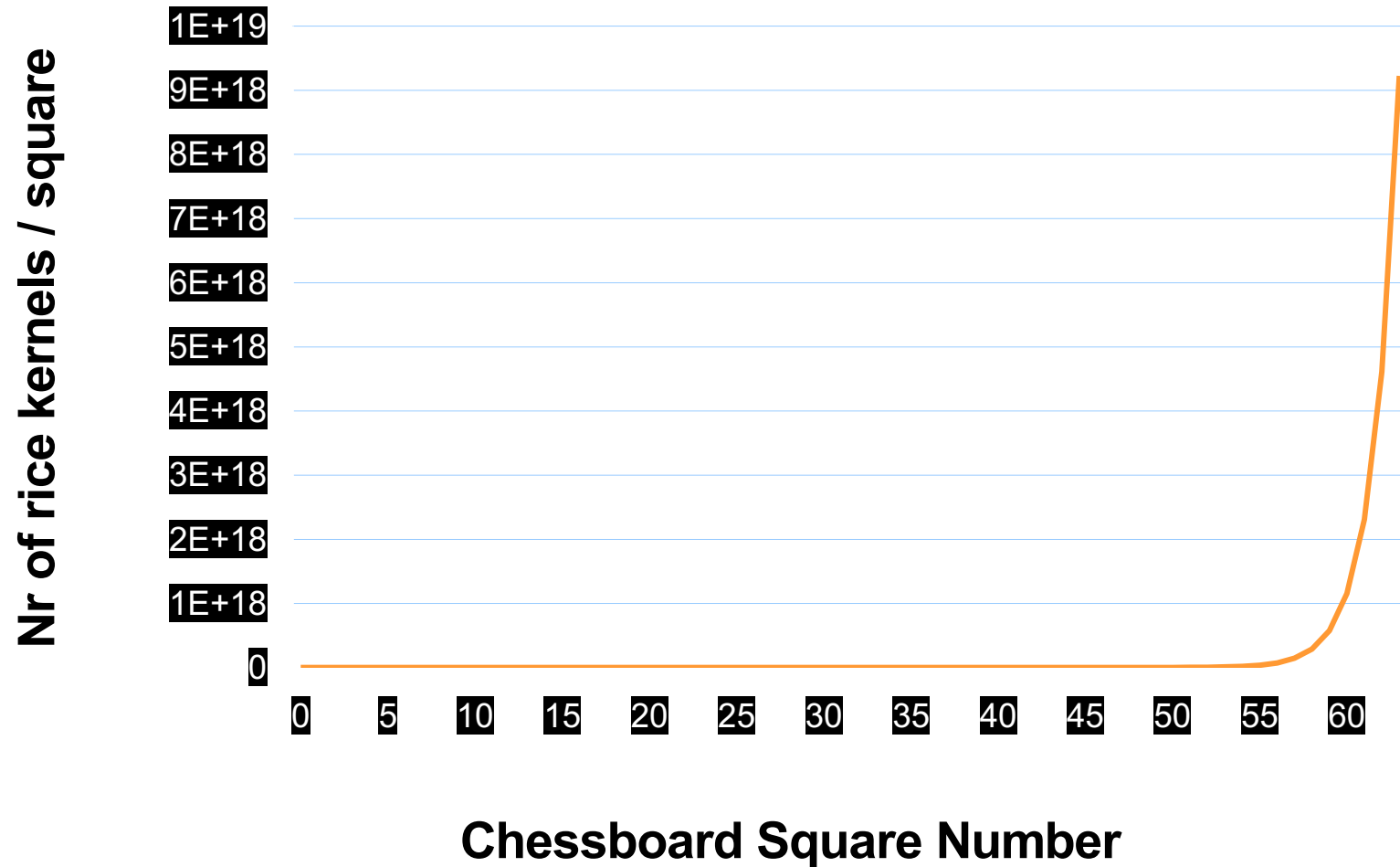


De Sage van de Koning van Persië

$$2^{63} = 9,2854,775,808$$



The Shape of Exponentiality





TALENT

SECURITY

CARBON

***“The greatest shortcoming of the human race
is its **inability** to understand the exponential function”***

Albert Bartlett

RESOURCES

TECHNOLOGY

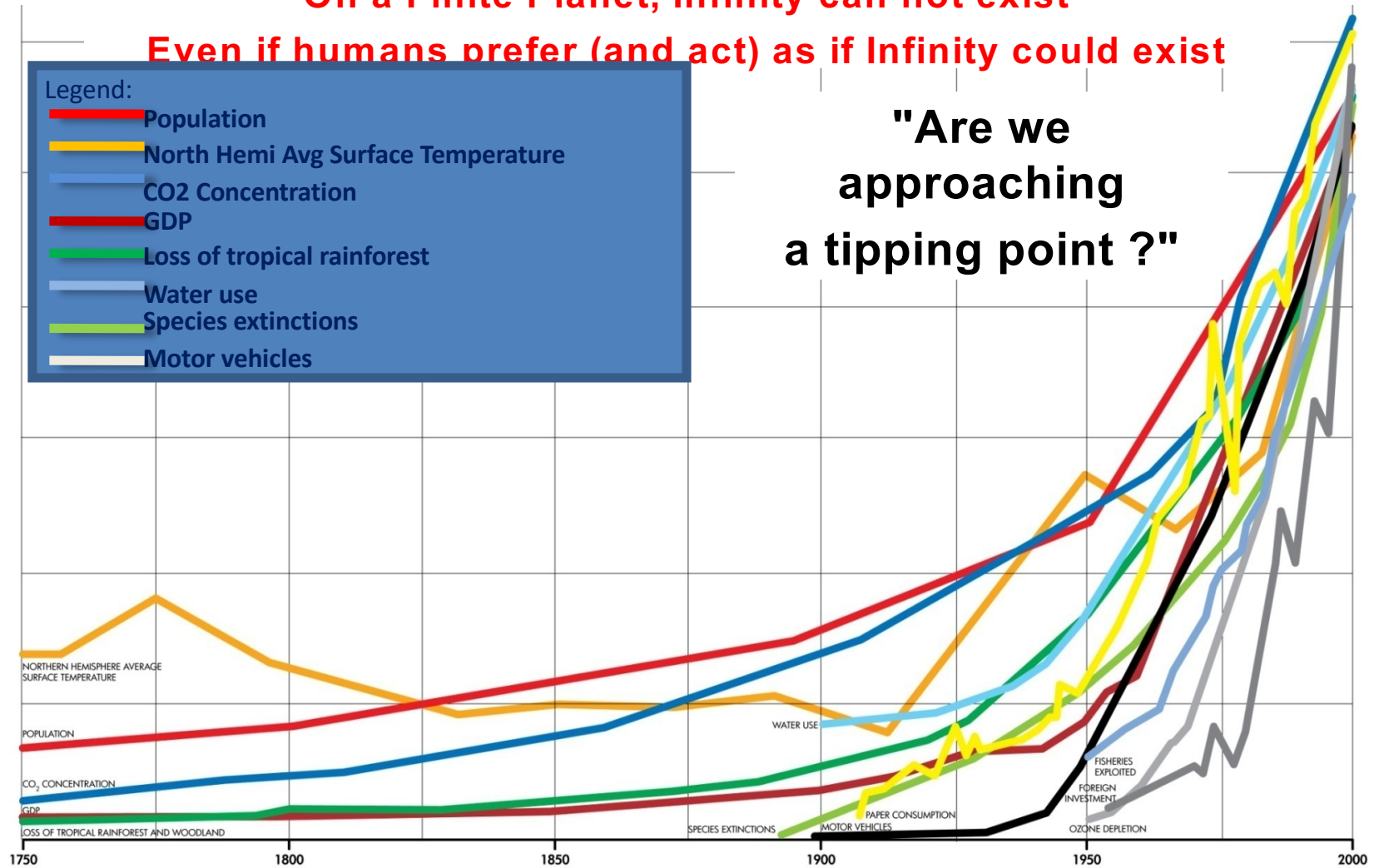
ENERGY

Accelerating & Fundamental Change

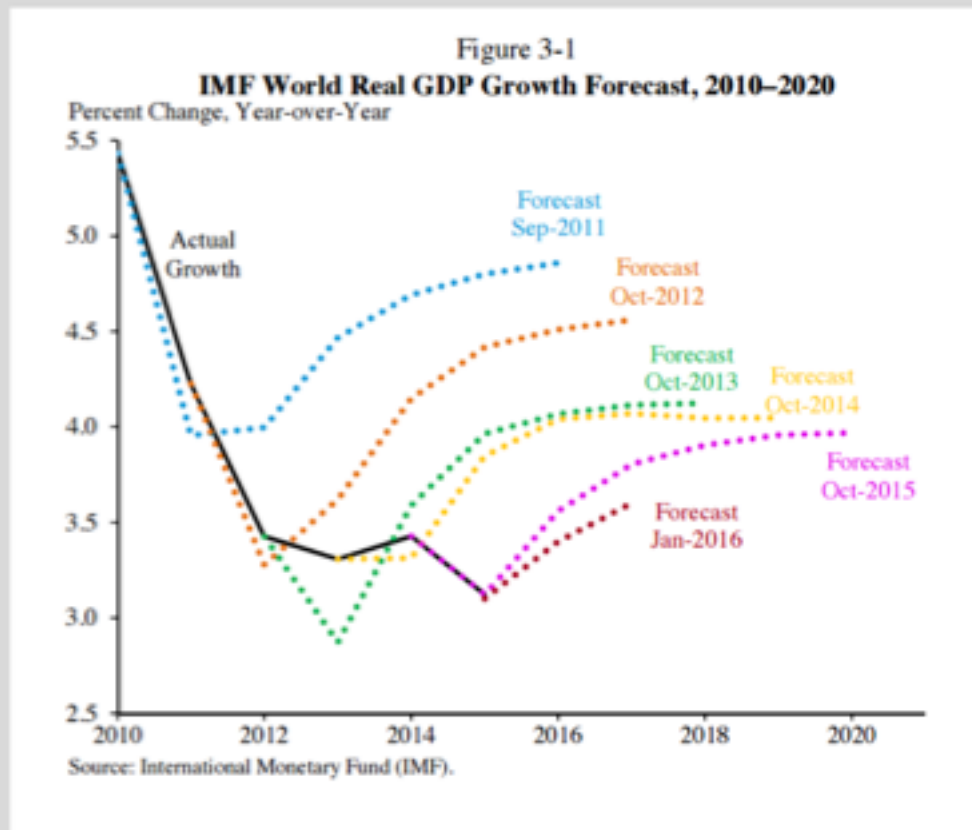
J-curves only exist in theoretical mathematics

On a Finite Planet, Infinity can not exist

Even if humans prefer (and act) as if Infinity could exist



Growth Predictions vs. Reality



During the past years, growth prediction for almost all economies – and on global level – were constantly overoptimistic, and most countries grew at a slower pace than anticipated during the recovery since the 2008/9 crisis

“Anything can happen” : **Is NOT true**

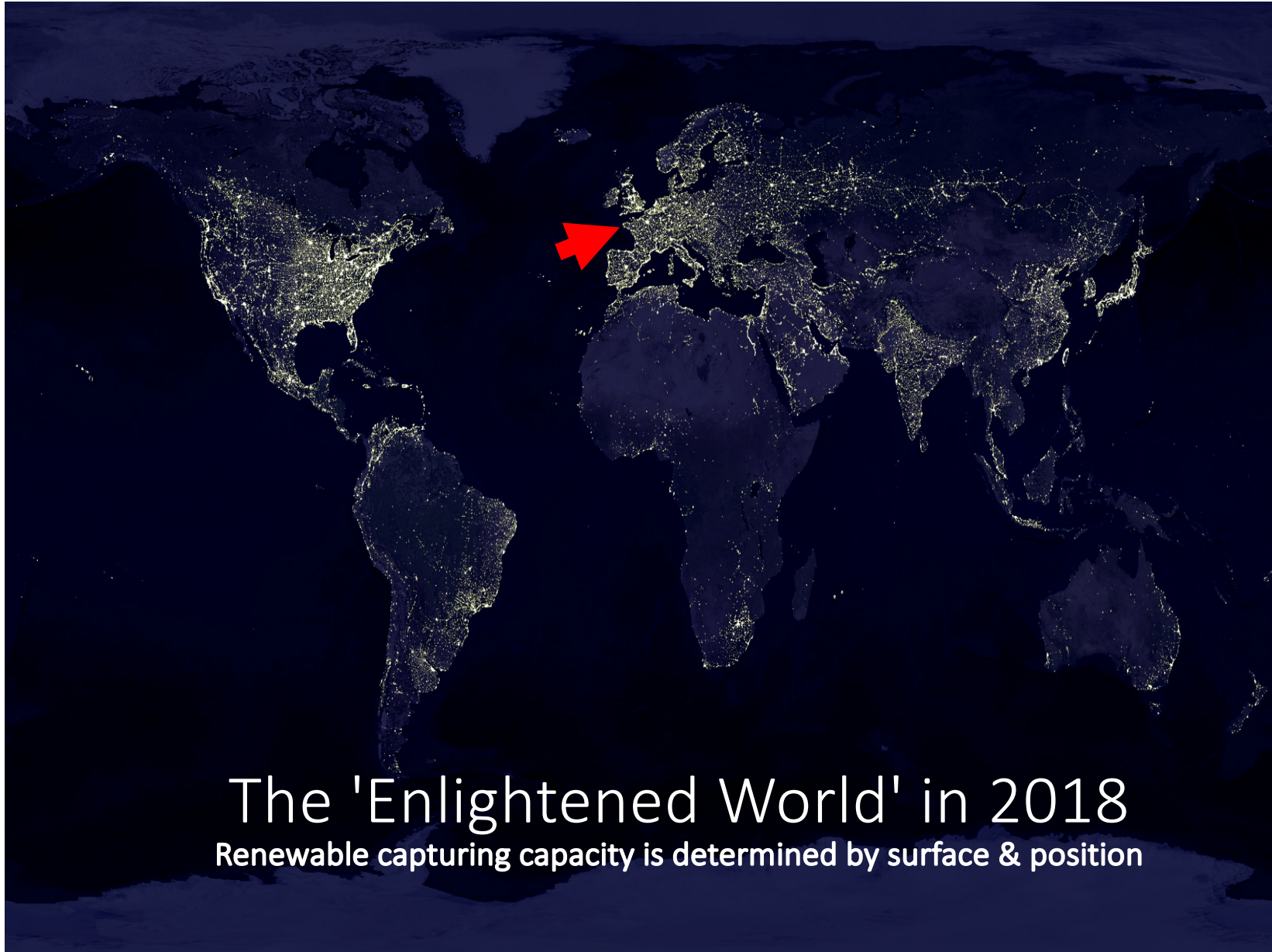


“Key Drivers of the Future”



© University of Michigan

Demographics + RESOURCES / ENERGY + Innovation

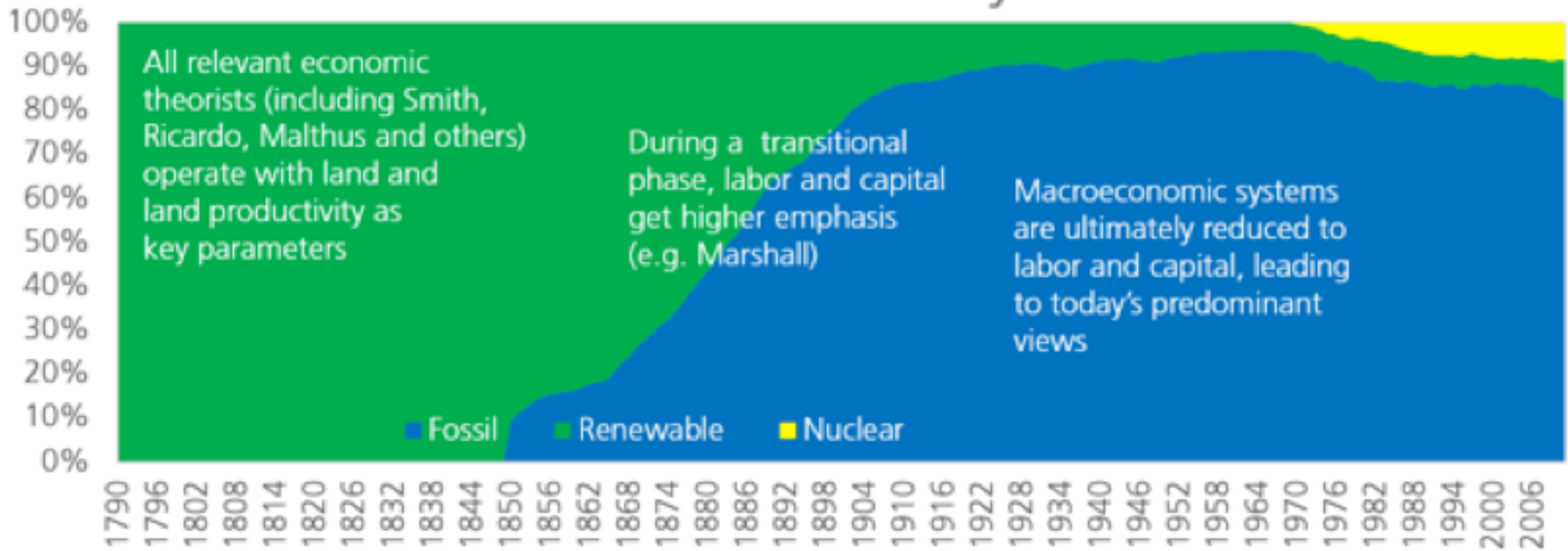


The 'Enlightened World' in 2018

Renewable capturing capacity is determined by surface & position

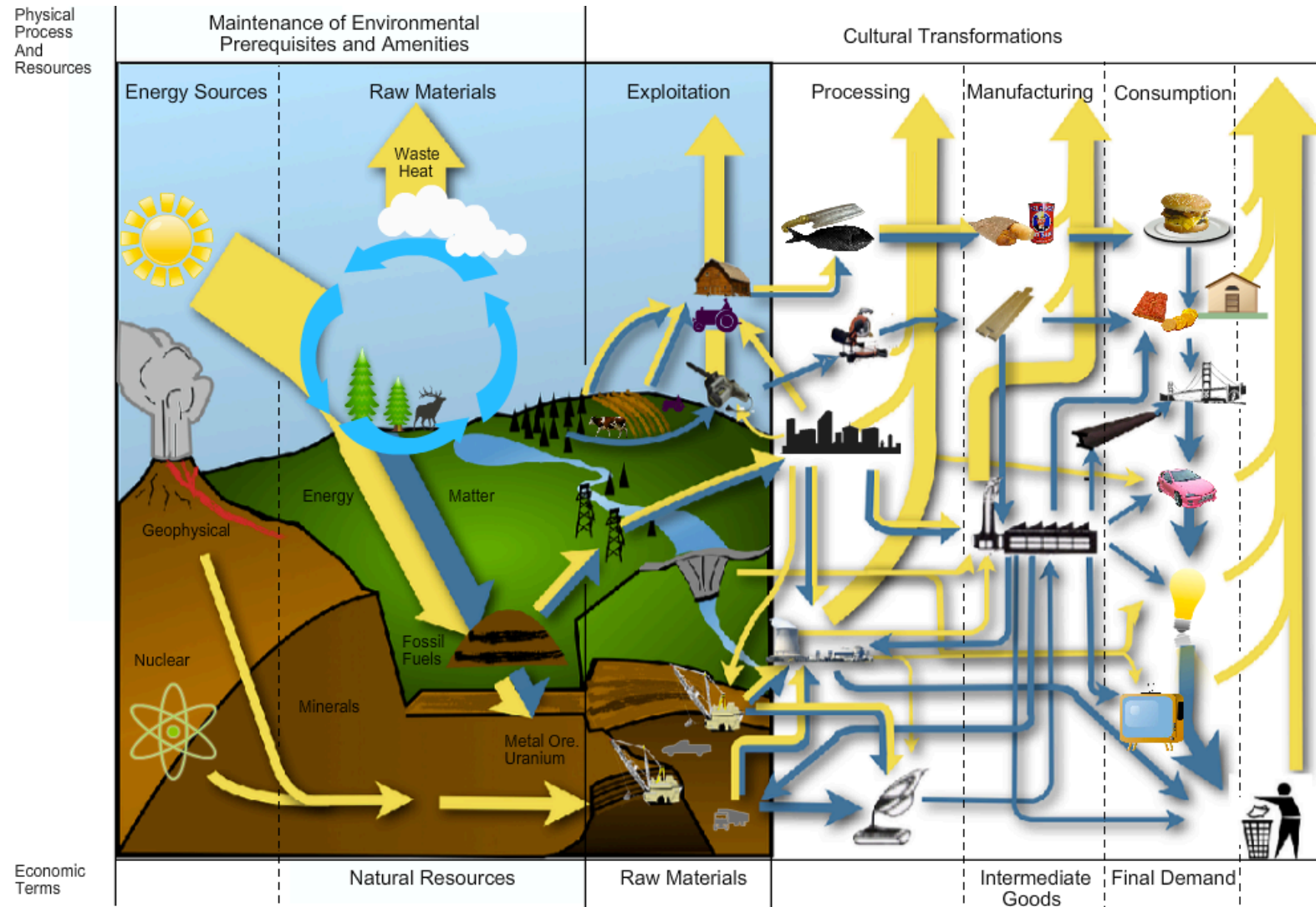
INSIGHT : our Energy Supply influences our Perception of Reality & Predominant Economic Theory

Energy share by source* vs. predominant economic theory

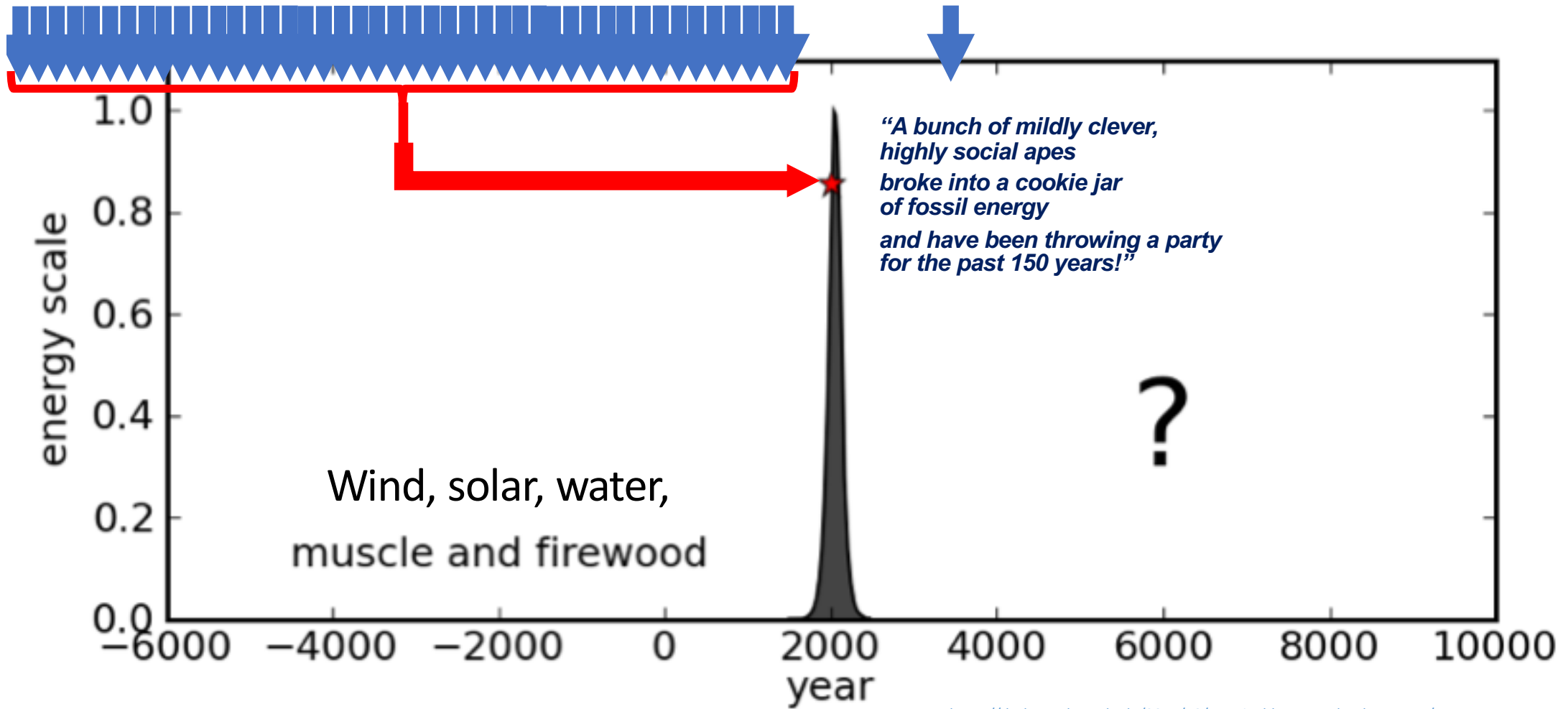


Overview of Bio-physical Reality

Energy enable process to convert Natural Resources into Cultural Transformations

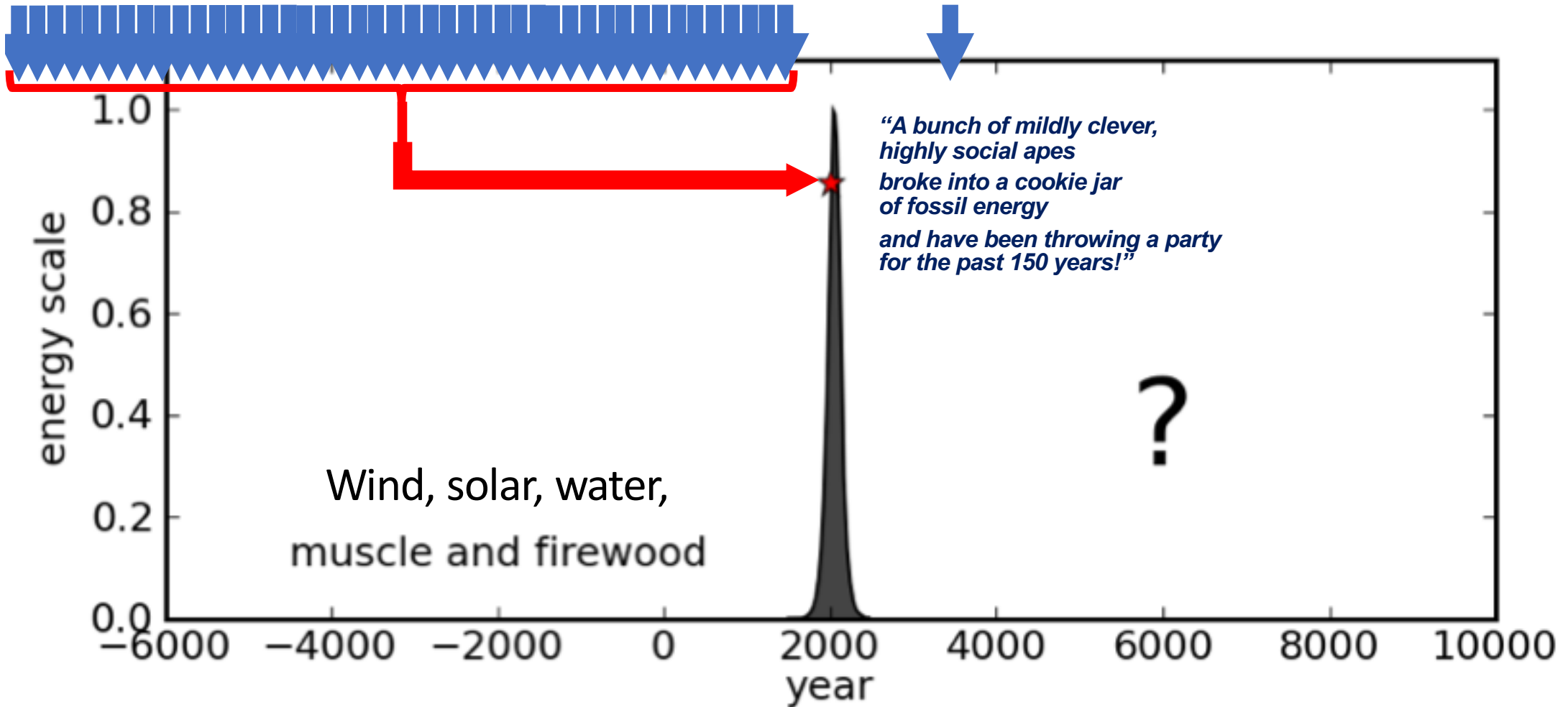


Simplified overview of our Reality : Current Solar vs Past Solar



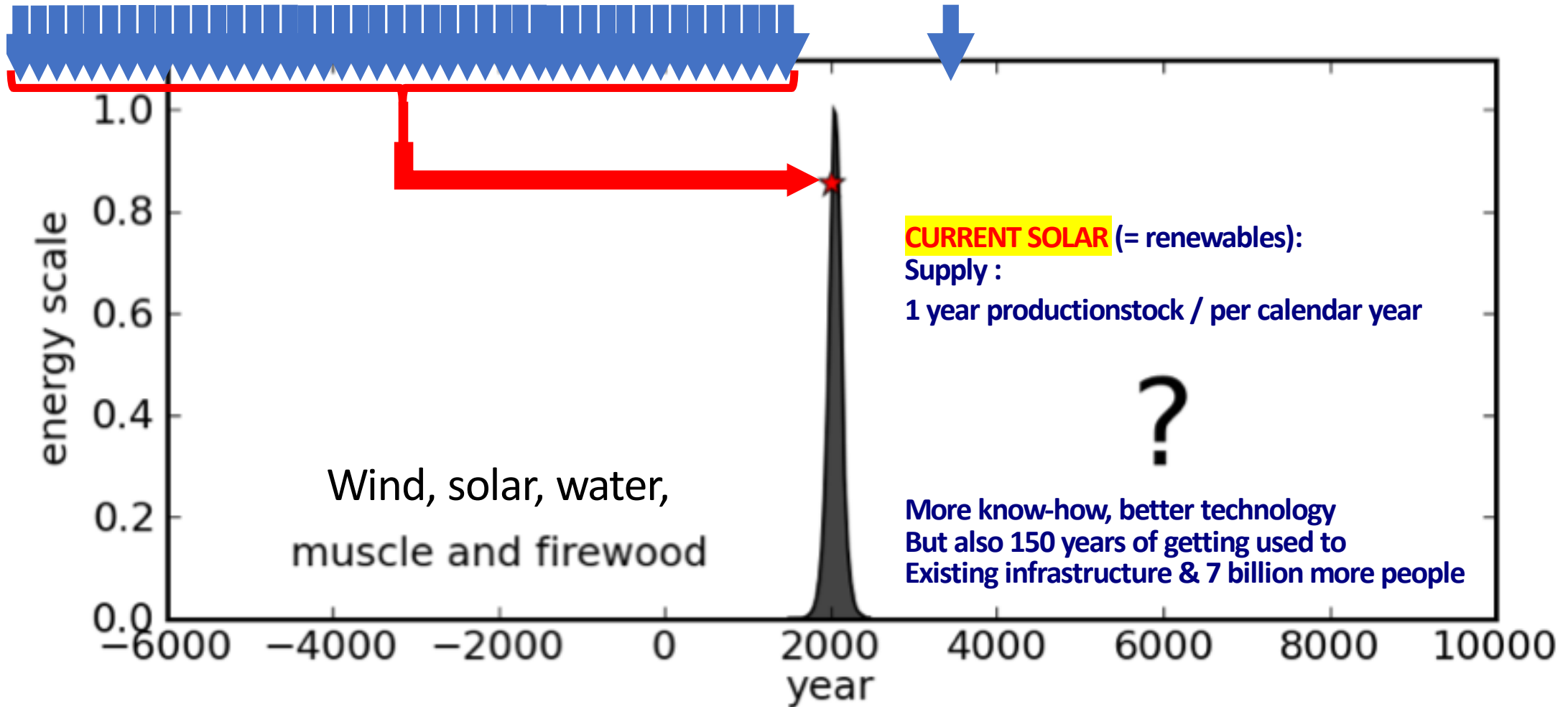
Simplified overview of our Reality : Current Solar vs Past Solar

PAST SOLAR (=fossil) is 500 mio years of condensed prehistoric photosynthesis / solar power – Half now consumed!
Average ANNUAL Consumption : 250 mio years reserves / 250 years = 1 mio year past solar production / per calendar year
2016 consumption = 4.5 mio years prehistorische productie (= 22x the time humans roam this planet)



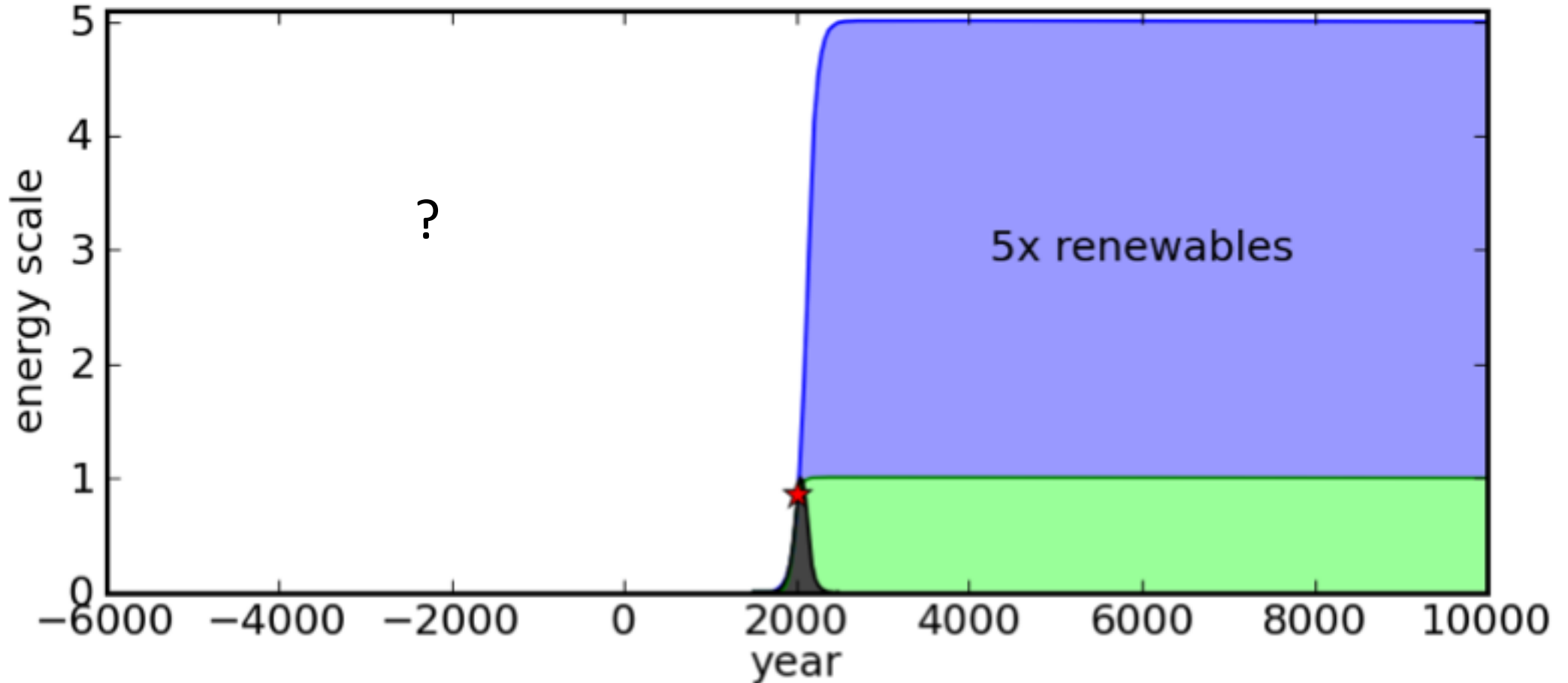
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3 Existentially important Insights, currently missing in public policy discourse about Way Forward

1. **Capacity & Production** is *not* the same – Renewable Energy is stochastic. Requires 5-10 units capacity for 1 unit produced output.
2. **Presence & Density** is *not* the same : Density determines economic availability (recycling requires energy too (cobalt, koper, etc)
3. **Chemical & Electric Storage** : is *not* the same. Not just 24 hours, but weeks/months. (*Batteries: Resource intensive / Power2Gas ignored*)

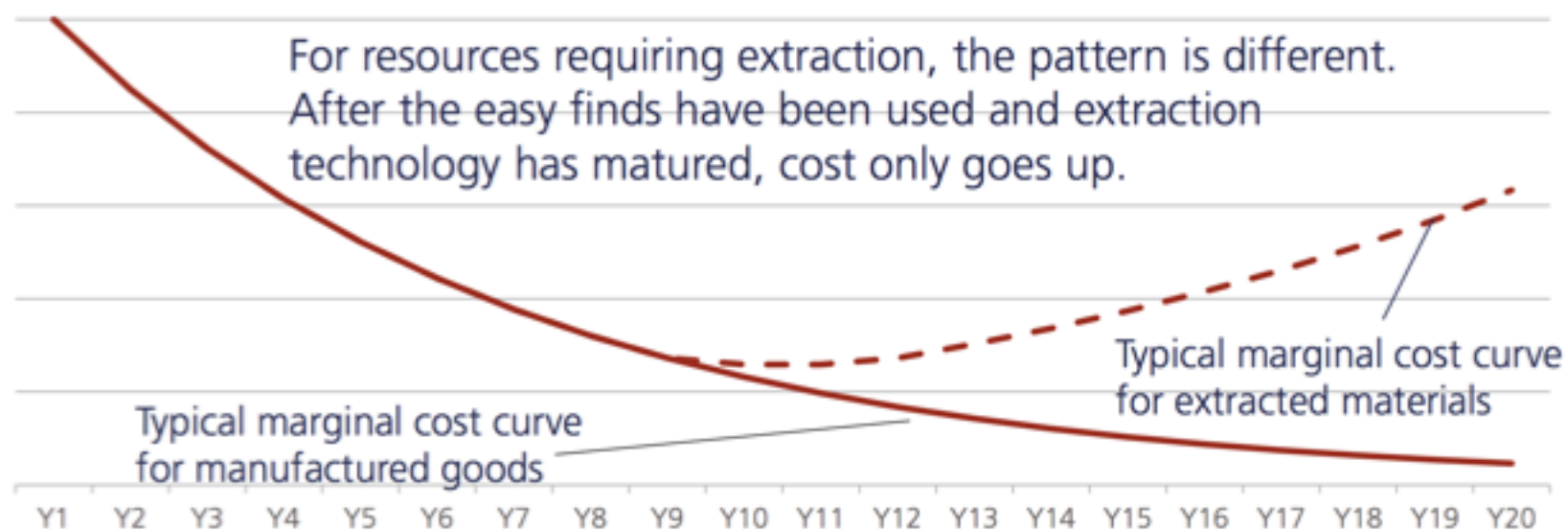


Mother Nature, over 500 mio years **conveniently stored** the prehistoric solar energy **for free** in various fossil molecules. With current solar energy **we have to arrange & pay for the storage**. This should be included in the energy scenarios, which many tend to forget.

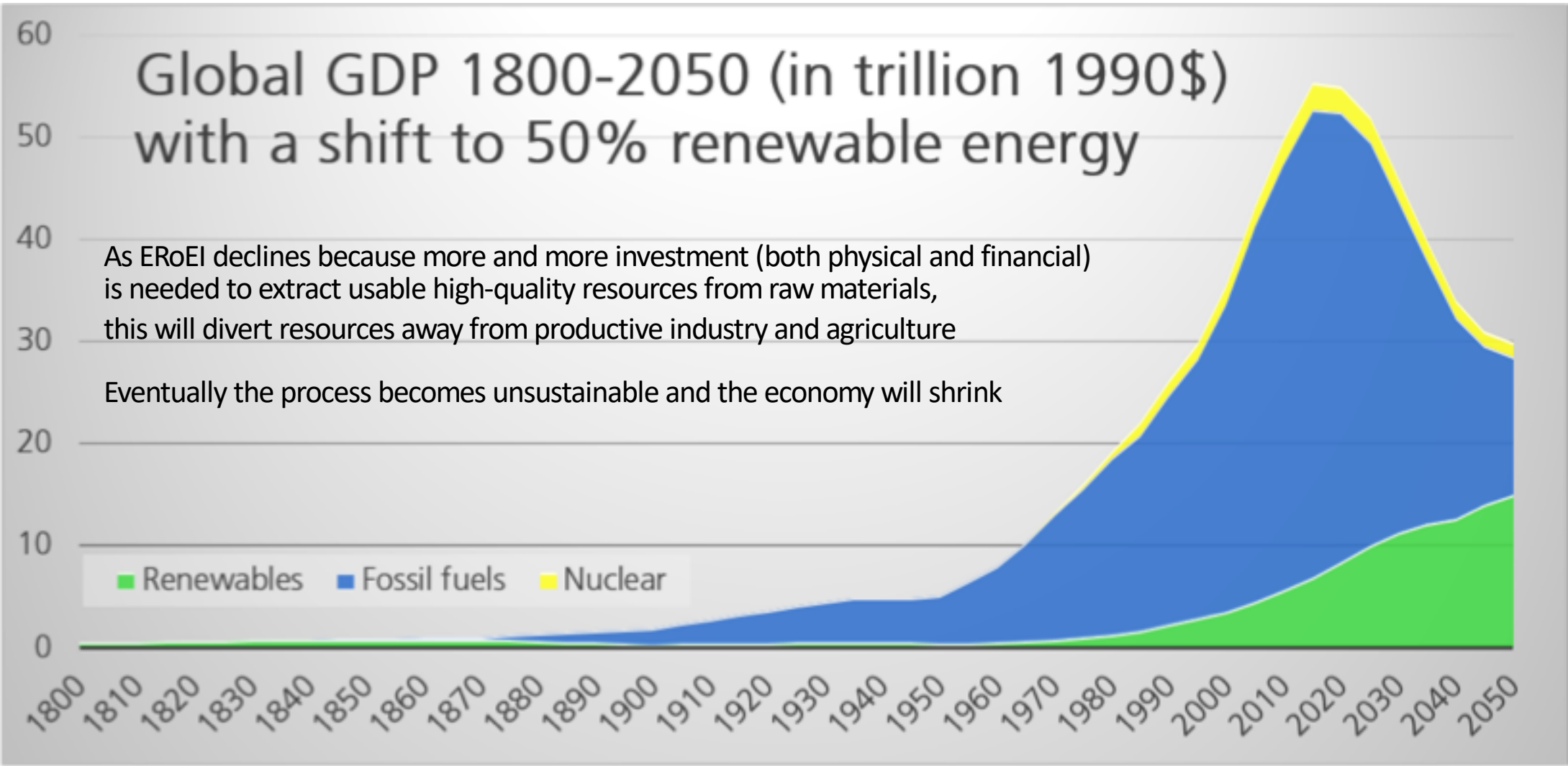
Marginal cost is irreversibly growing

In most production environments, we are used to constantly shifting price curves, leading to lower and lower cost for goods, based on improvements in technology and efficiency.

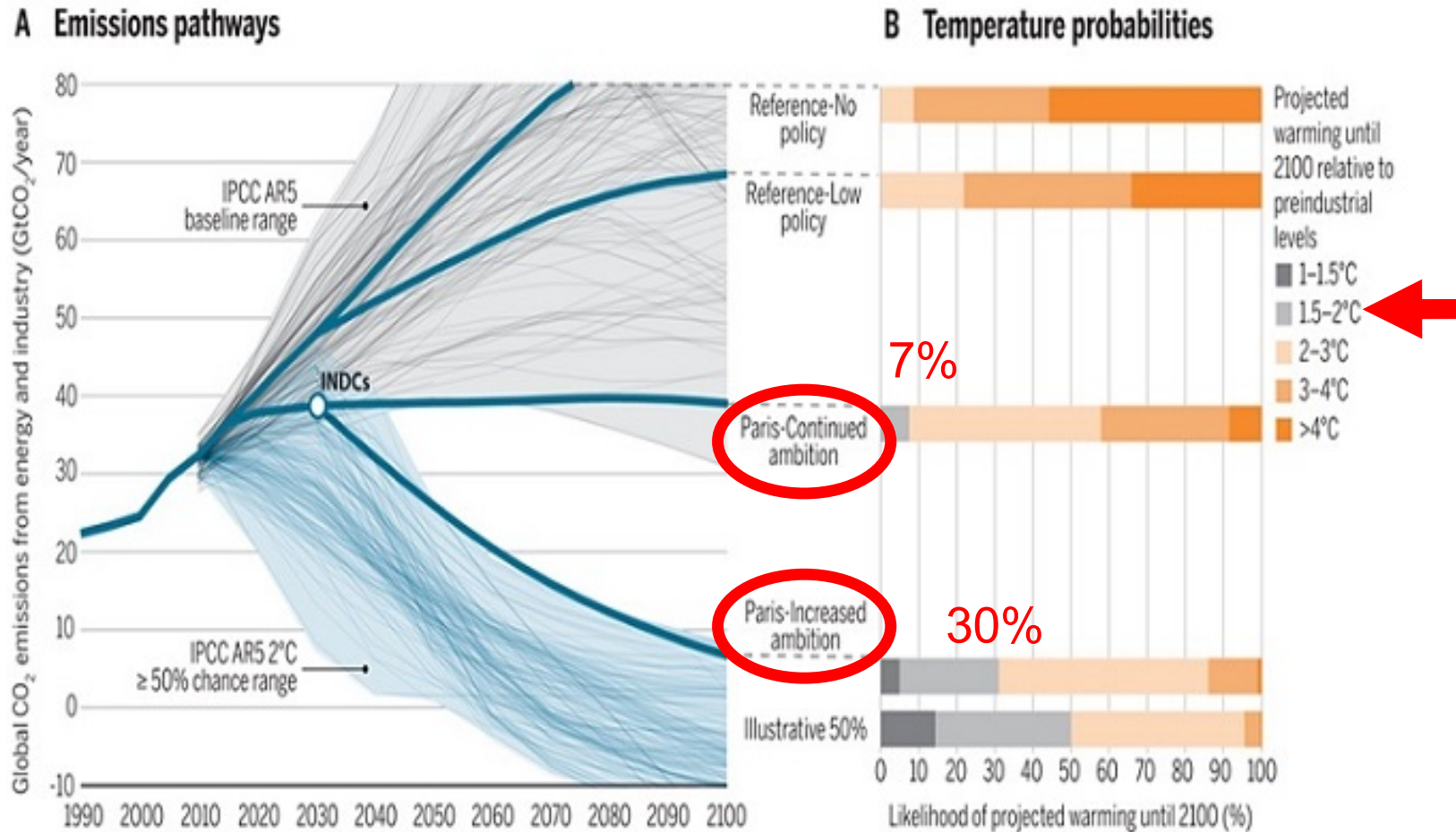
For resources requiring extraction, the pattern is different. After the easy finds have been used and extraction technology has matured, cost only goes up.



Davos Consensus for 21th Century: long term 2% growth
INSIGHT : our Leaders are wrong by a factor of 4!



195 Nations + EU signed COP21 in Paris

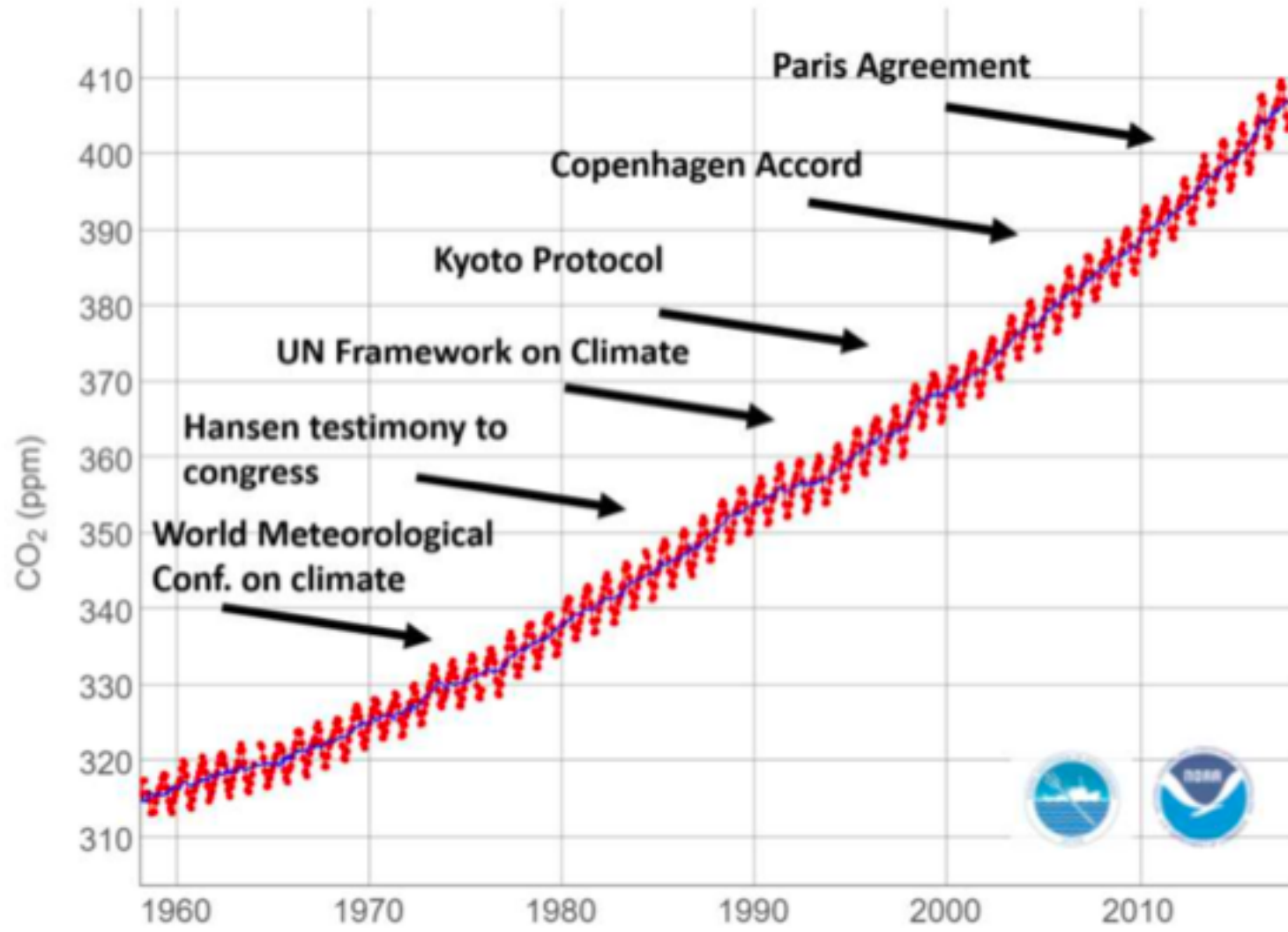


Whilst ratified, even without Trump factor : COP21 = New Years Resolution

Progress is the result of Actions. Not of Ambitions.

Mauna Loa Monthly Averages

Geen Daden maar Woorden !



1912 IBM Centenary 2012

Modeling
with 21st century
supercomputing power

Club of Rome Scenario

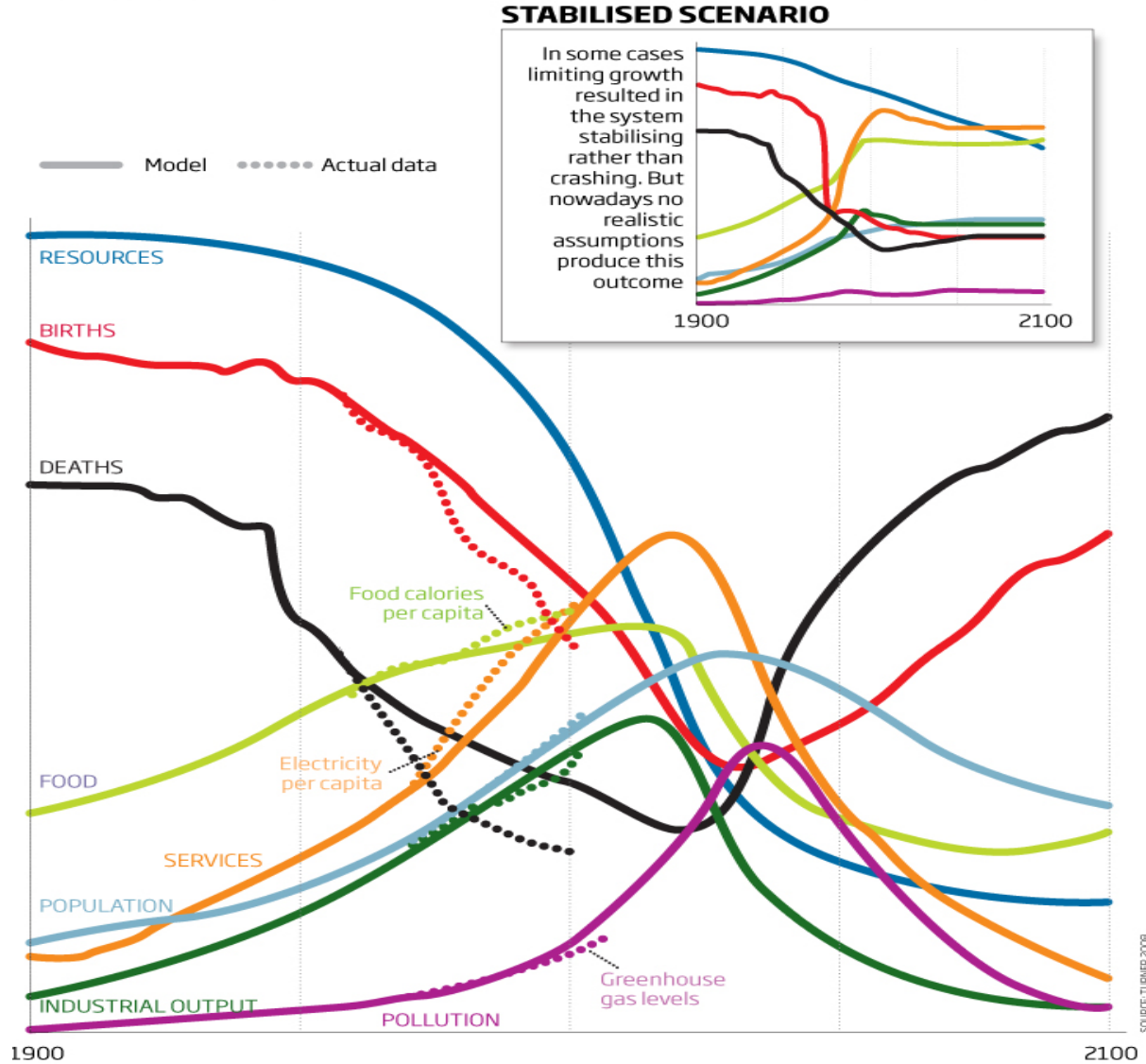
Note
Accuracy vs Actual data

Published in NewScientist

Boom and bust

©NewScientist

In most runs of the World3 computer model, rapid growth is followed by sharp decline. So far the standard run (main graphic) corresponds well with measurements of real-world equivalents (dotted lines)



GOOD NEWS Majority of people expect the next generation to have less disposable income **Unavoidable!**
 Large proportion of people also expect the next generation to have less wellbeing **Avoidable!**

We need to GET REAL ABOUT REALITY! – Nature is a mighty partner, not a slave

“Mildly clever, highly social apes do not voluntarily make radical changes to their ways of living”.

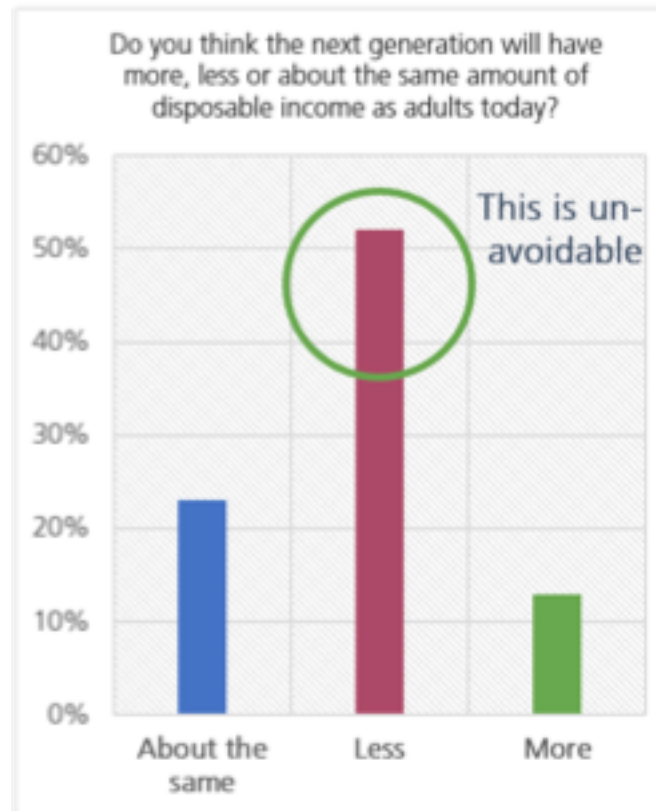


STEMcoalition.eu

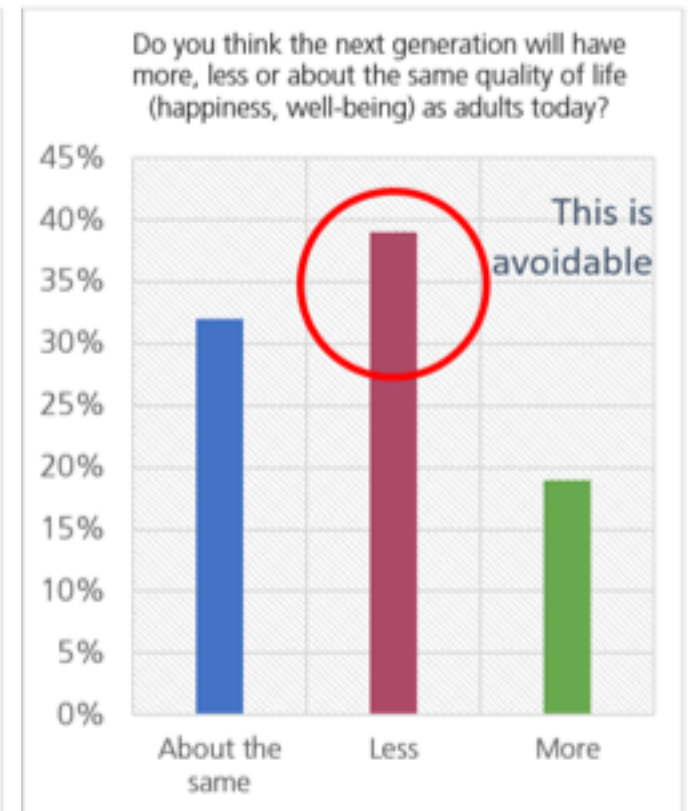
Verimedia.org

EnergyandStuff.org

IIER documents scientifically what a majority already senses



IIER works on ensuring that we can still be happy with less material wealth



YouGov poll Q1/2015 on Americans' prospects about the future /Over €10K zero correlation w happiness

Think sySTEMically !

www.stemcoalition.eu

- Get **REAL**, about reality
- Get **HONEST**, in communicating about reality
- Get **ON**, with future proof actions, and keep populists at bay

INSIGHT 1.0

It is imperative that Leaders **grasp reality** and start to **communicate honestly** about it. If they fail, they not only **risk destabilizing society**, but also **endanger democracy** as populists will exploit the anger & frustration in society when **physics & chemistry will prove Leaders' plans wrong**.



This (y)our only home ...



... use (y)our Talent to preserve it!

VAB Bouwen aan de Toekomst

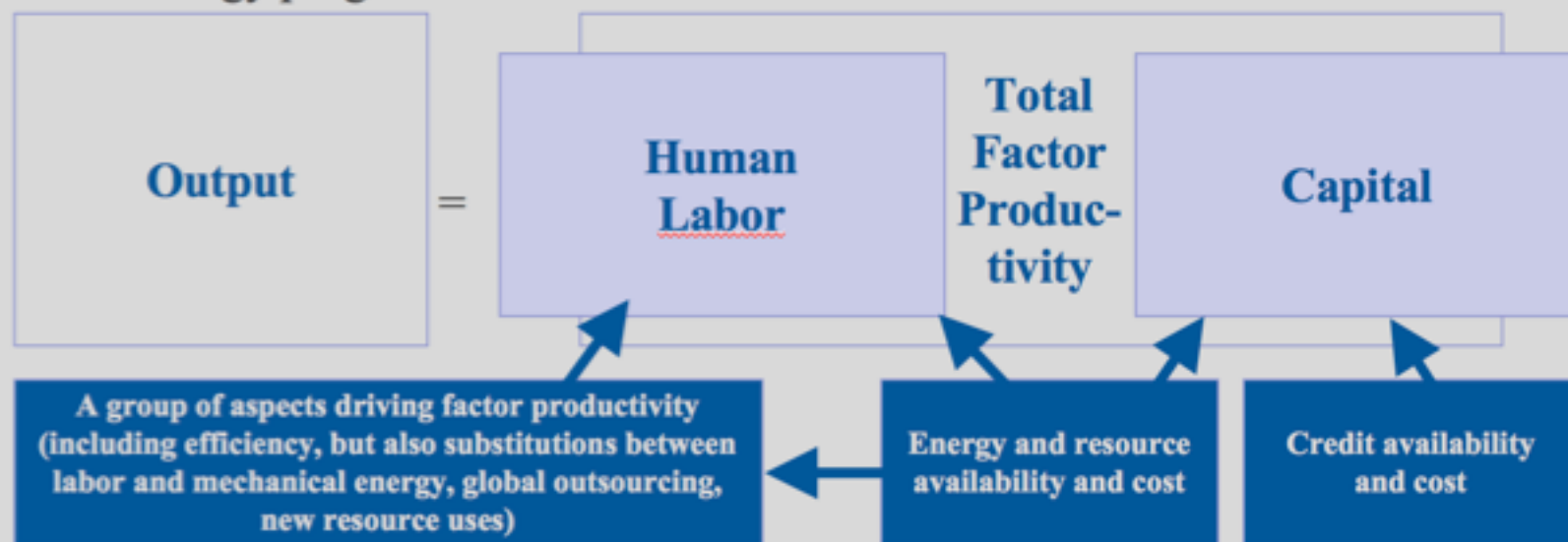


<https://www.youtube.com/embed/WmVLci-XKnM>

Back up Slides

Economists missed those connections (as they imposed no limits until recently)

The key drivers behind the (dependent) Cobb Douglas variables can be identified as
1. natural resources (including energy), 2. credit availability and, to a certain degree
3. technology progress



Ultimately, economic activity is hard-limited by current natural resource availability/density and availability of prehistoric land, which has very limited elasticity.

Today's Reality

From : **Davos WEF Overview**

‘Global events this year have reminded decision makers that the more complex a system, the greater a community’s concern about its future’

From : **IIER**

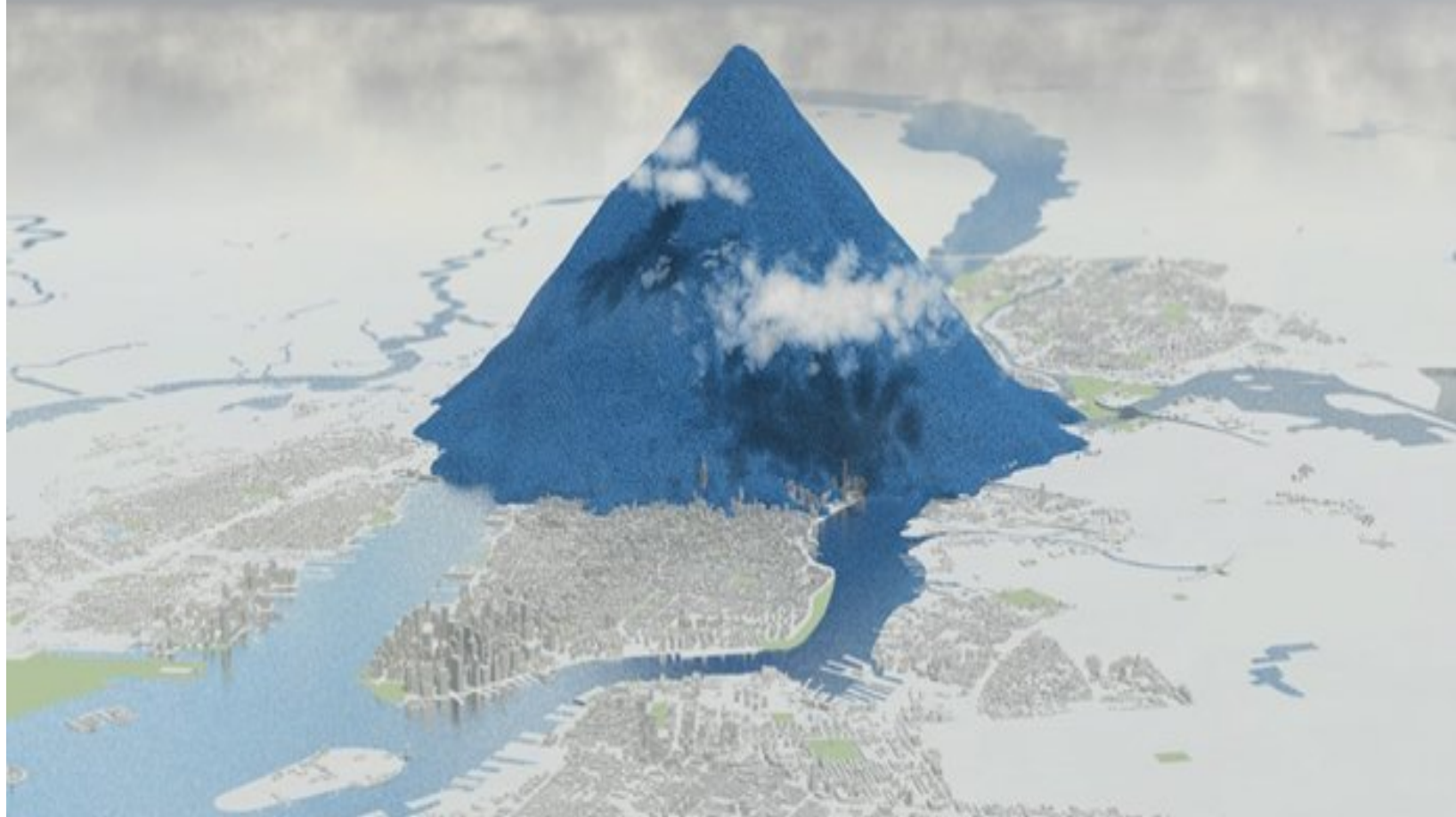
‘Whilst the shortsighted sense of reality of current global elites is the rootcause of the current problems.....

From : **Financial Times**

‘..... elites far more brutal, stupid and damaging than this can all too easily be imagined’

One day of global CO2 emissions
(Carbon Visuals)

One day of global CO2 emissions



Perceived Economic Reality vs Government Statistical Theory

WEF - Davos : Reality 1.0

Experienced growth is defined by GDP growth minus inflation. The 21st century fairy tale is that there is growth. However, CPI Inflation is only experienced by the middle income quintile. All other quintiles experience higher inflation than GDP growth. In EU, US and Japan the majority of people have experienced shrinking incomes for 9, 15 and 20 years resp.

