

Talent & Technology...

...to thrive in the 21st Century

.....



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Chairman Advisory Board

***Institute for Integrated
Economic Research***

www.energyandstuff.org

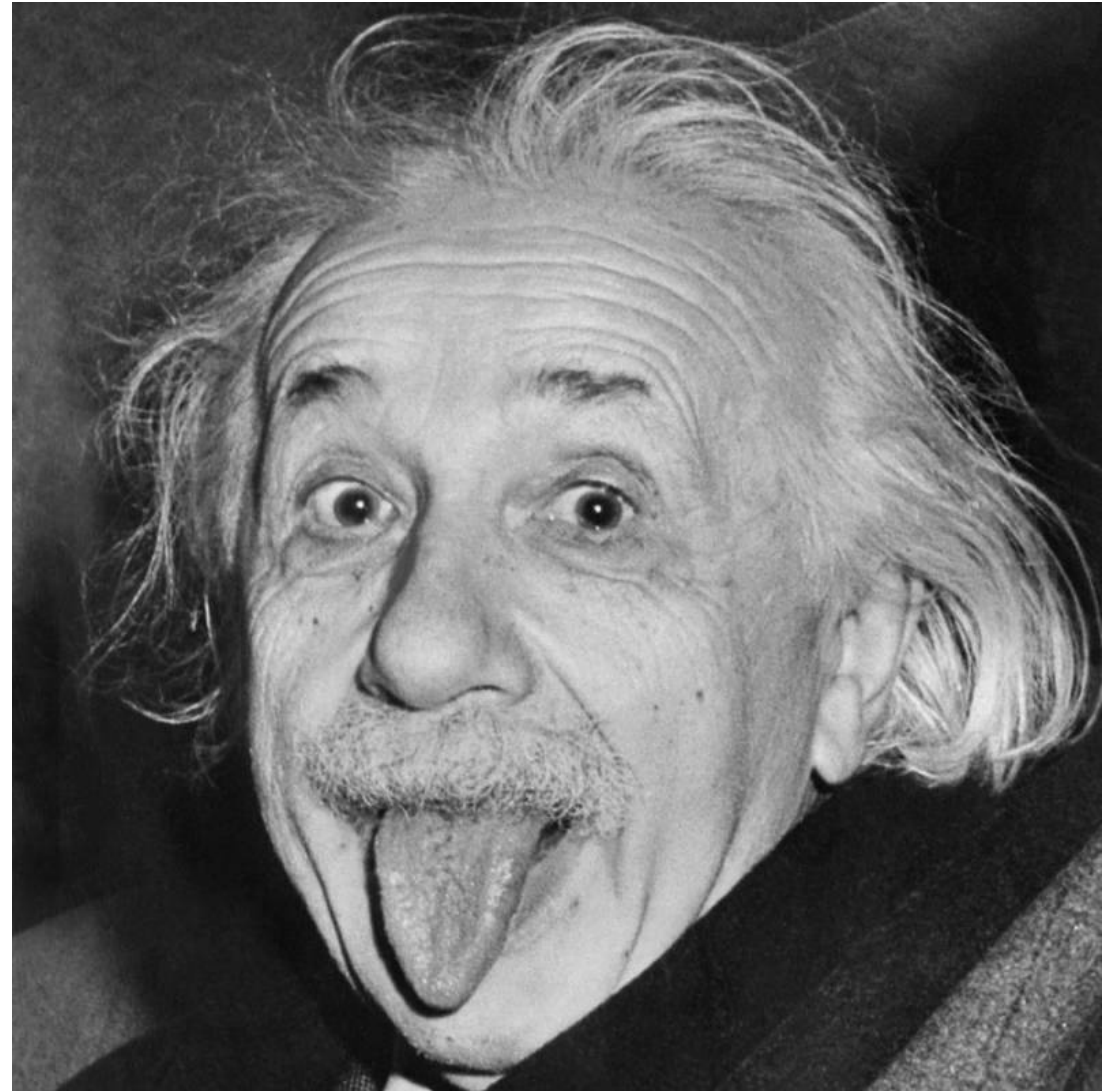


STEAM Day – May 3rd 2019

Istanbul

“I have no special Talents.

I am only passionately curious”



Albert Einstein, leaving his 72nd Birthday celebration in 1951



Top 10 skills

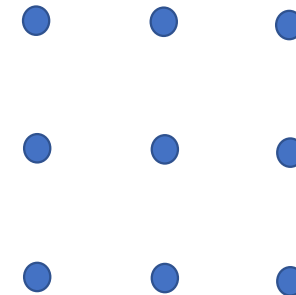
in 2020

1. Complex Problem Solving
2. Critical Thinking
3. Creativity
4. People Management
5. Coordinating with Others
6. Emotional Intelligence
7. Judgment and Decision Making
8. Service Orientation
9. Negotiation
10. Cognitive Flexibility

in 2015

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9. Active Listening
10. Creativity

sySTEMic thinking
=
Critical – Logical - Holistic



Top 10 skills

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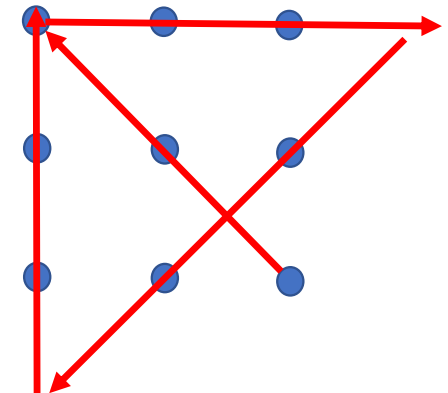
sySTEMic thinking

=

Critical – Logical – Holistic

+

ARTful Communication &
Creative Plan & Coordinated Action



Thinking OUTSIDE the box :

Seeing things that are NOT (there/now)

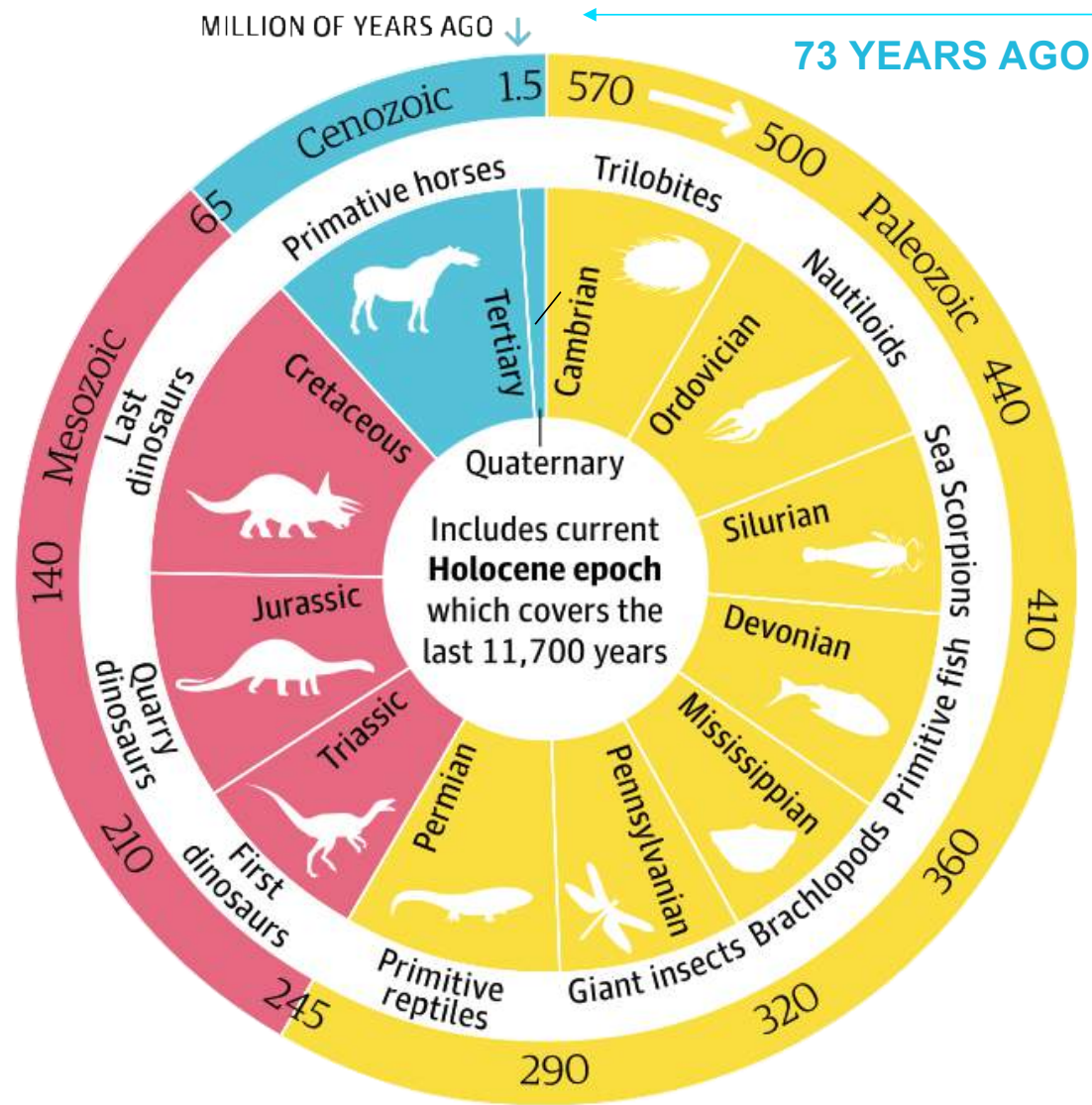
- Either things that were (*symptoms*)
- Things that may be (*goals/dreams*)



<https://www.youtube.com/embed/0yBzxC9eog>

- When did Oxygen begin to develop ?
- How long did Dinosaurs last ?
- When did Photosynthesis / Plant life start
- How long has our species been here ?

Geological periods 570m years ago to the present

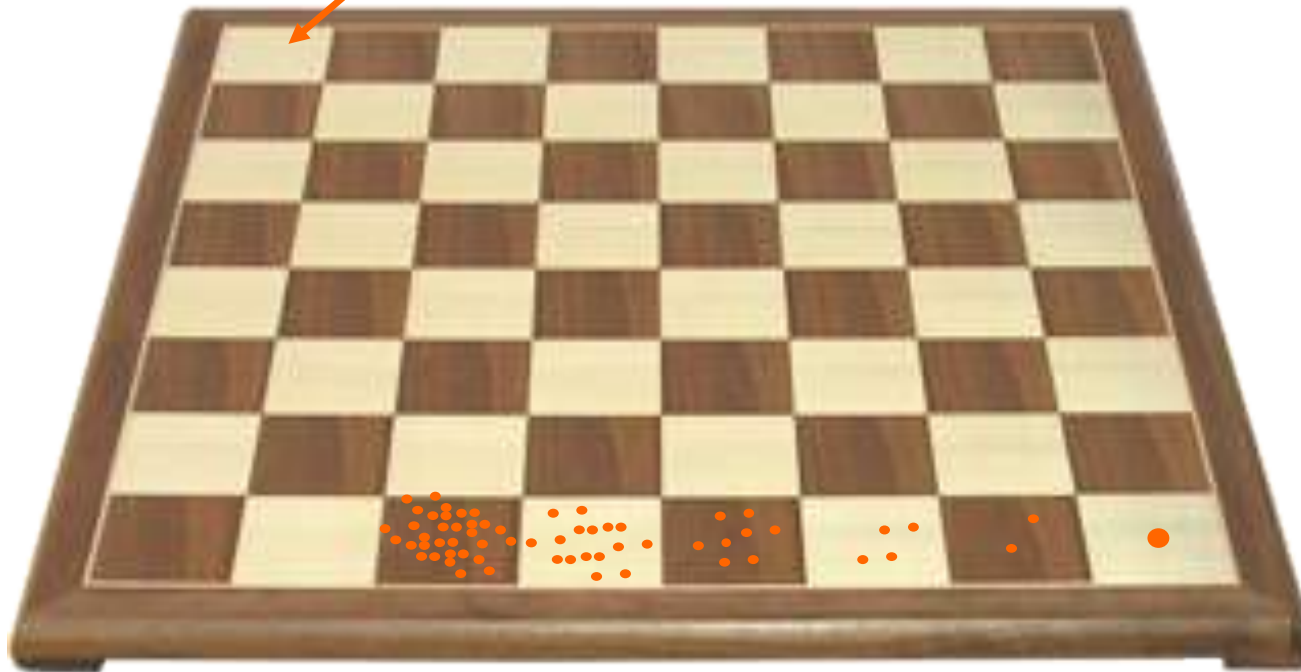


Los Alamos
16 July 1945:
start of
Antropocene

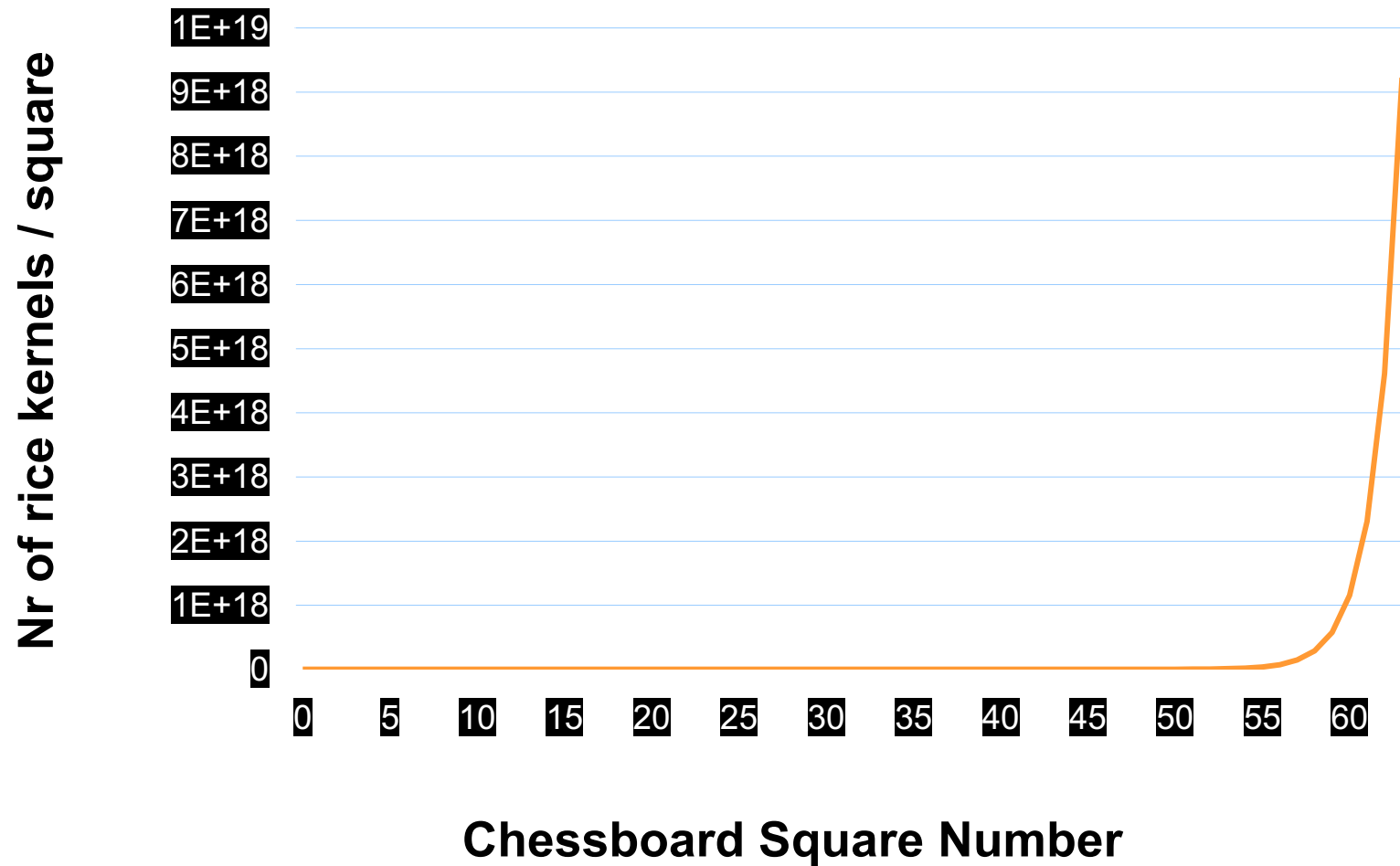


The tale of the Persian King

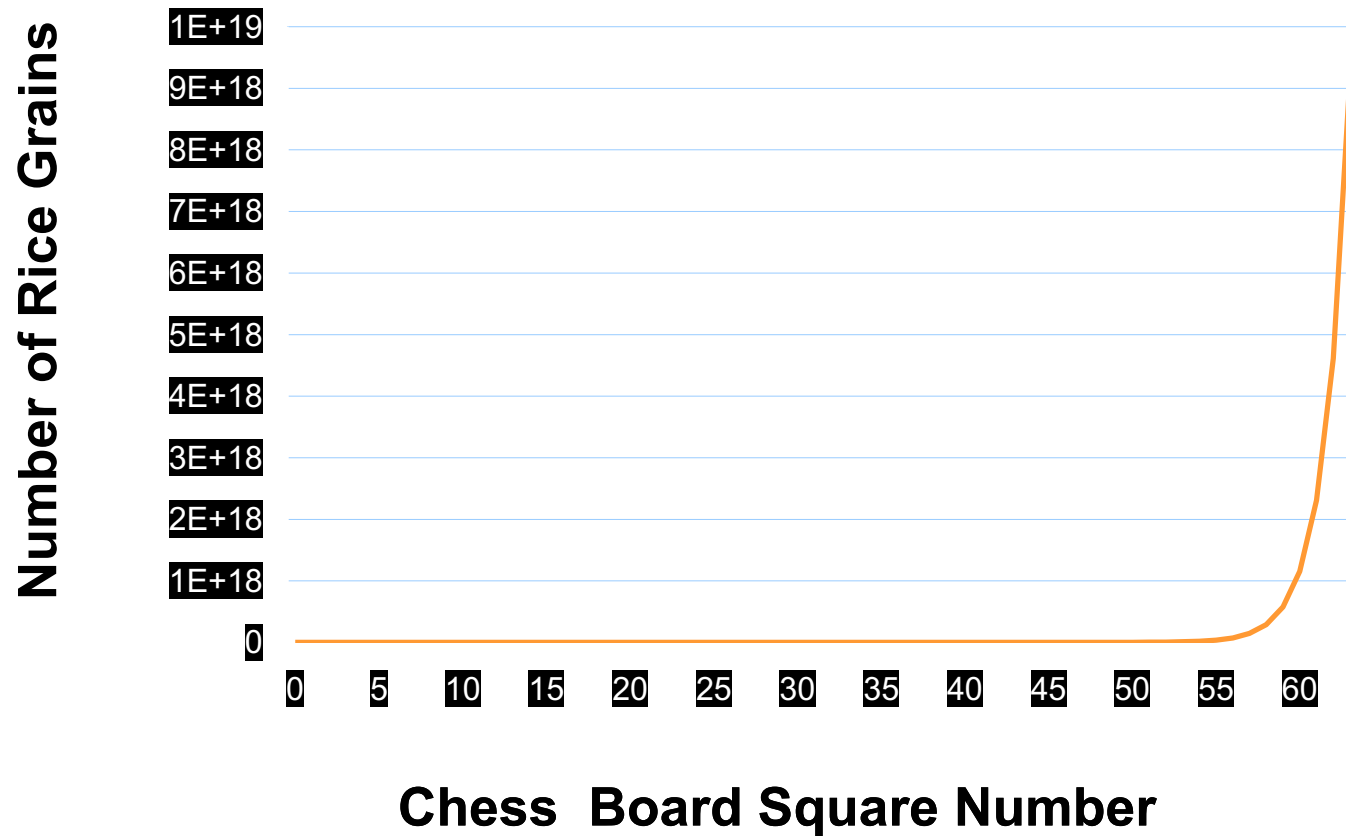
$$2^{63} = 9,223,372,036,854,775,808$$



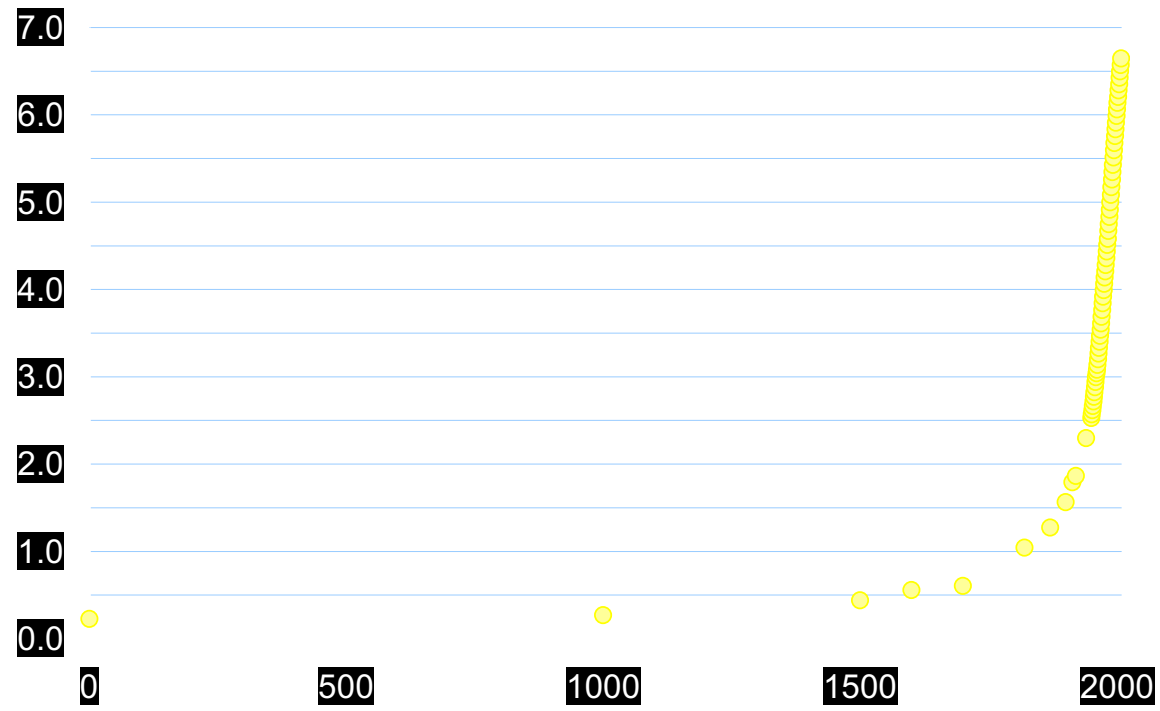
The Shape of Exponentiality



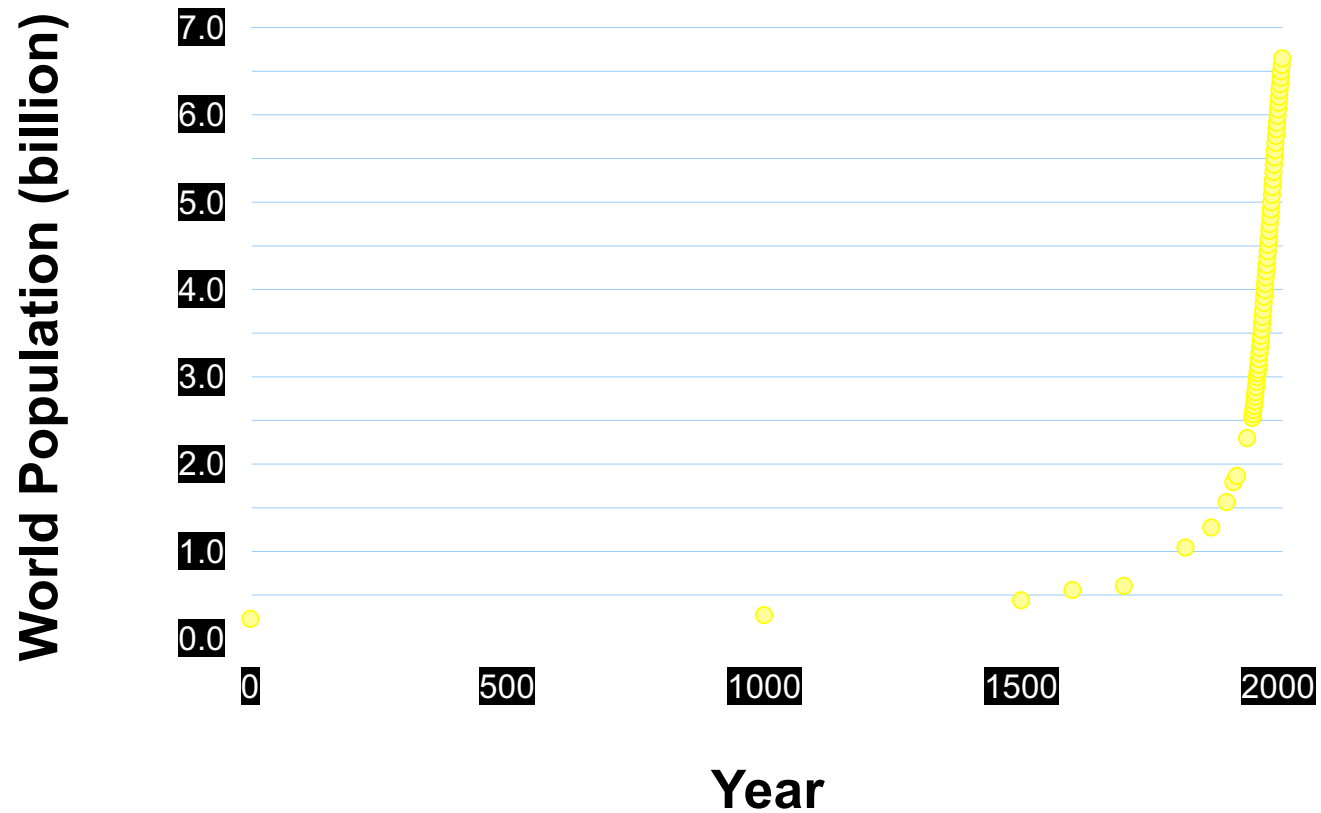
Exponentiality



What is this ?

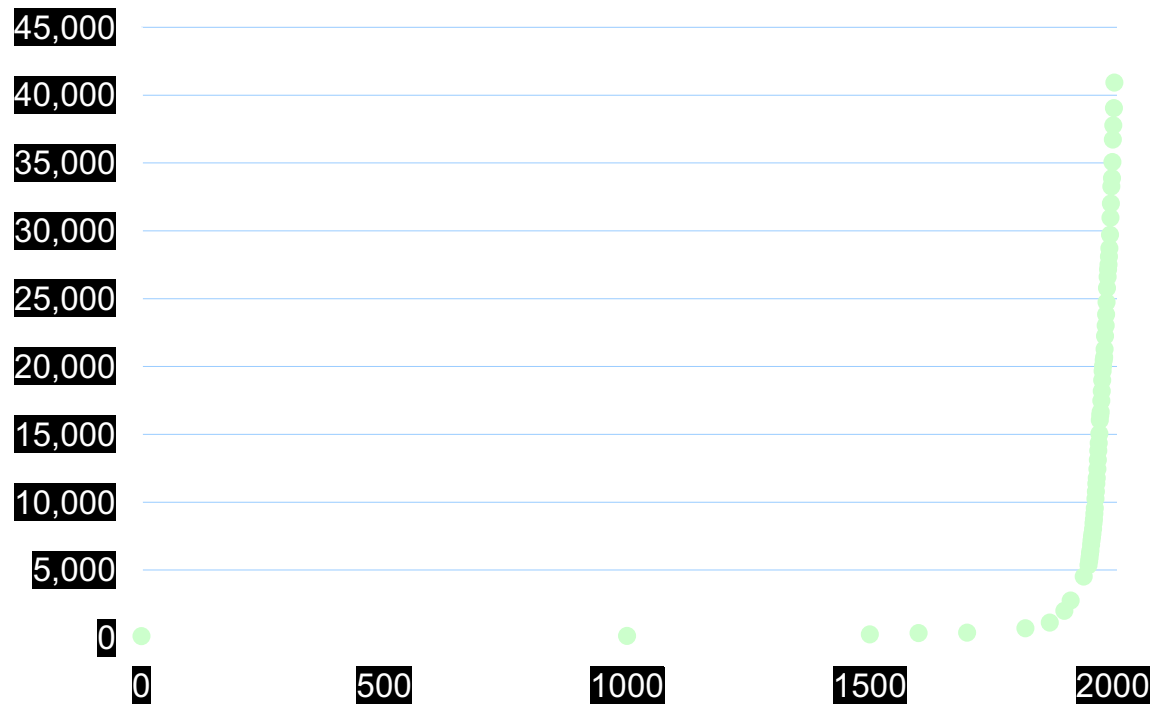


What is this ?

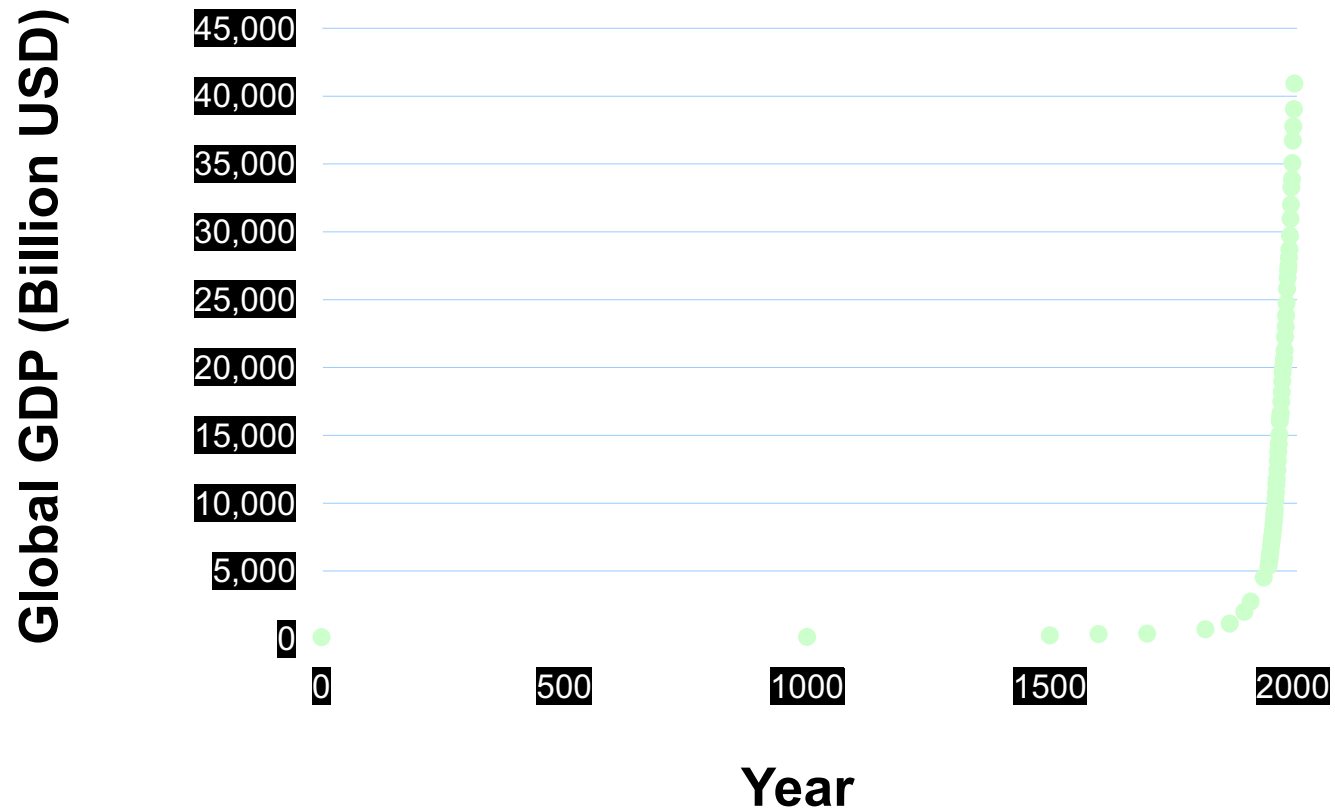


Source: Historical Statistics for the World Economy: 1-2003 Angus Maddison <http://www.ggdc.net>

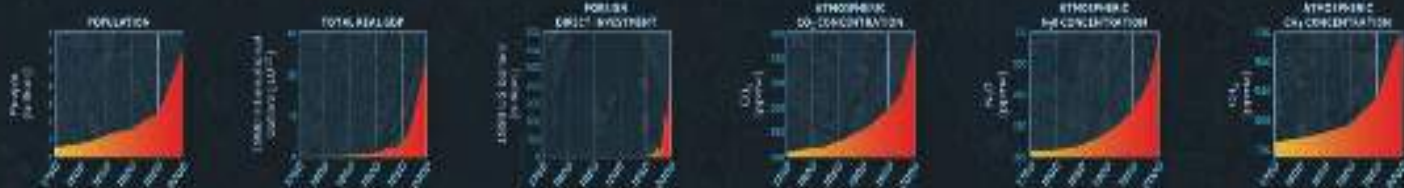
What is this ?



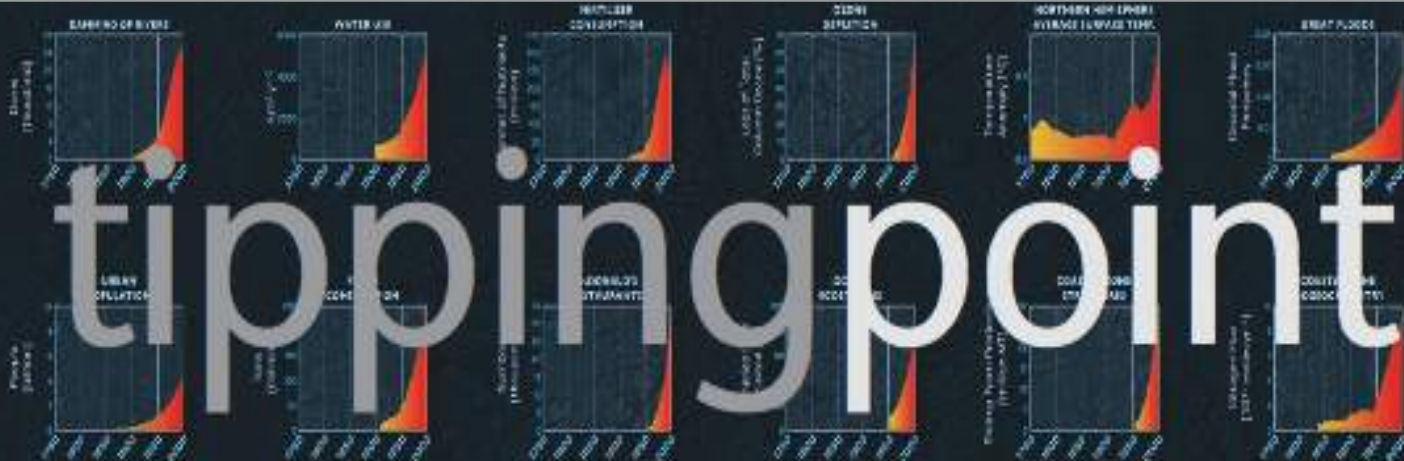
What is this ?



¹⁴
Source: Historical Statistics for the World Economy: 1-2003 Angus Maddison <http://www.ggdc.net>

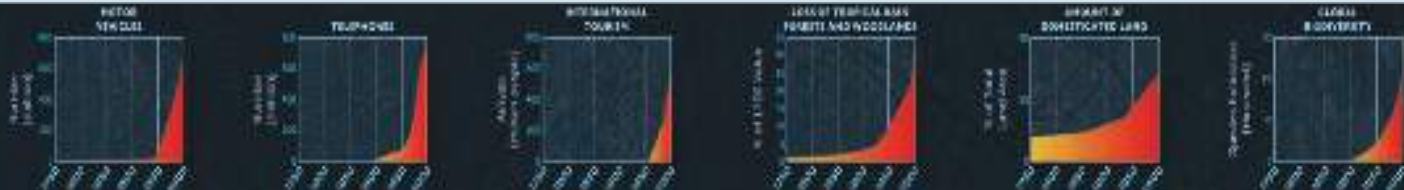


Today the Dashboard of Spaceship Earth looks like this



tipping point

Houston, we've got a problem !



TALENT

SECURITY

CARBON

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

Albert Bartlett

RESOURCES

TECHNOLOGY

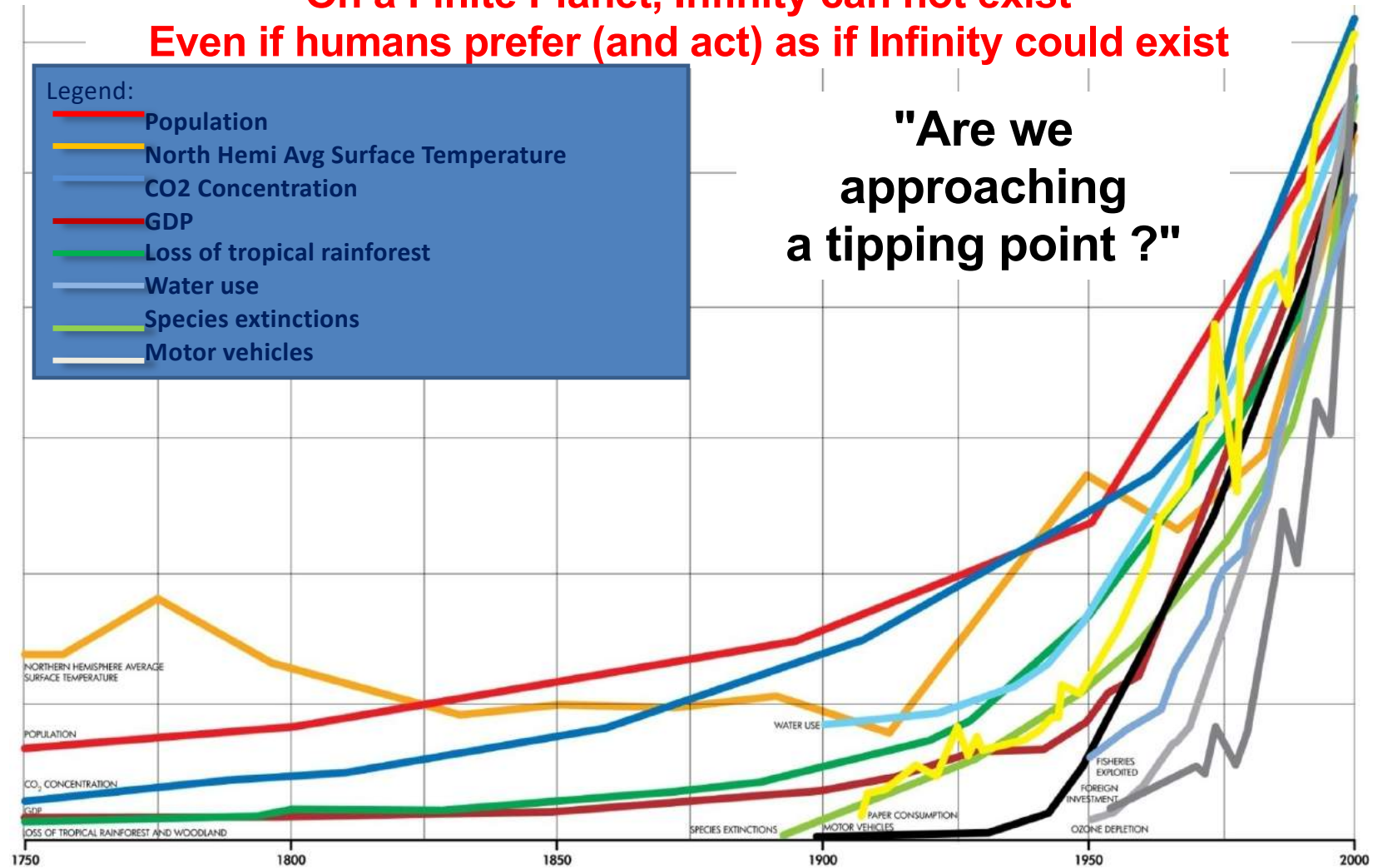
ENERGY

Accelerating & Fundamental Change

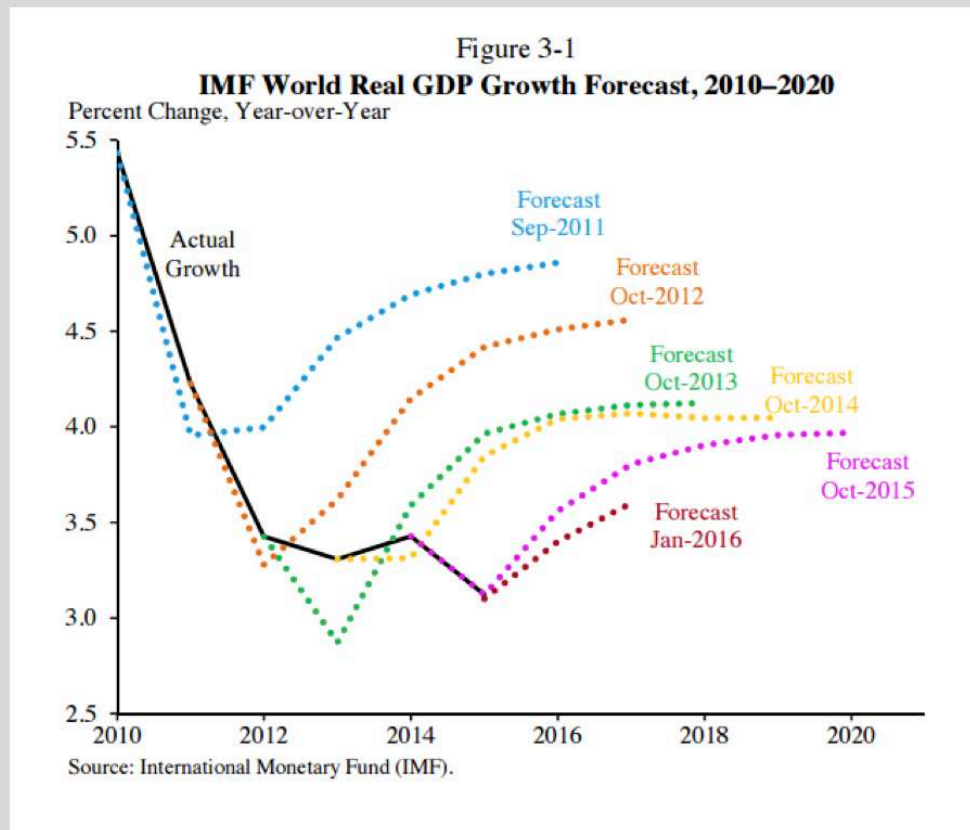
J-curves only exist in theoretical mathematics

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



©University of Michigan

“Key Drivers of the Future”



Demographics + RESOURCES / ENERGY + Innovation

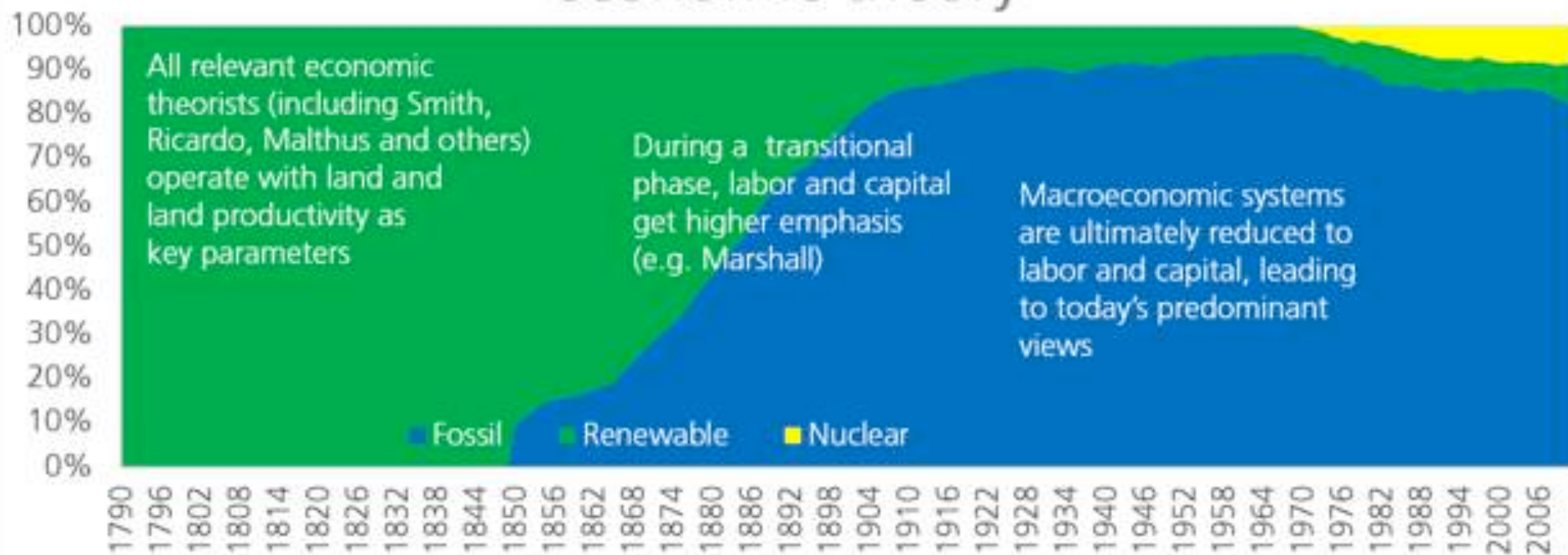


The 'Enlightened World' in 2019

Renewable capturing capacity is determined by surface & position

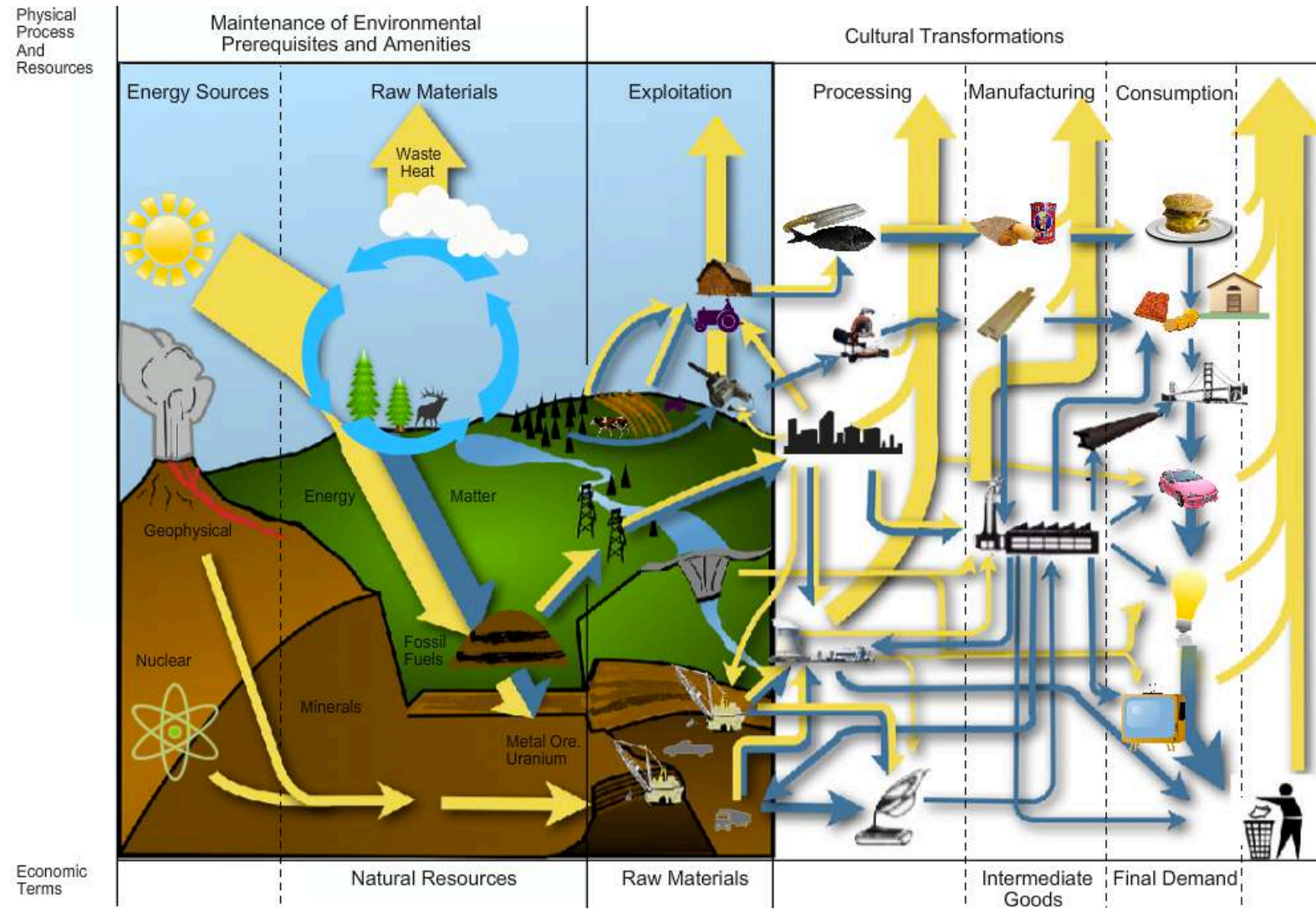
INSIGHT : our Energy Supply influences our Perception of Reality & Predominant Economic Theory

Energy share by source* vs. predominant economic theory



Overview of Bio-physical Reality

Energy enable process to convert Natural Resources into Cultural Transformations

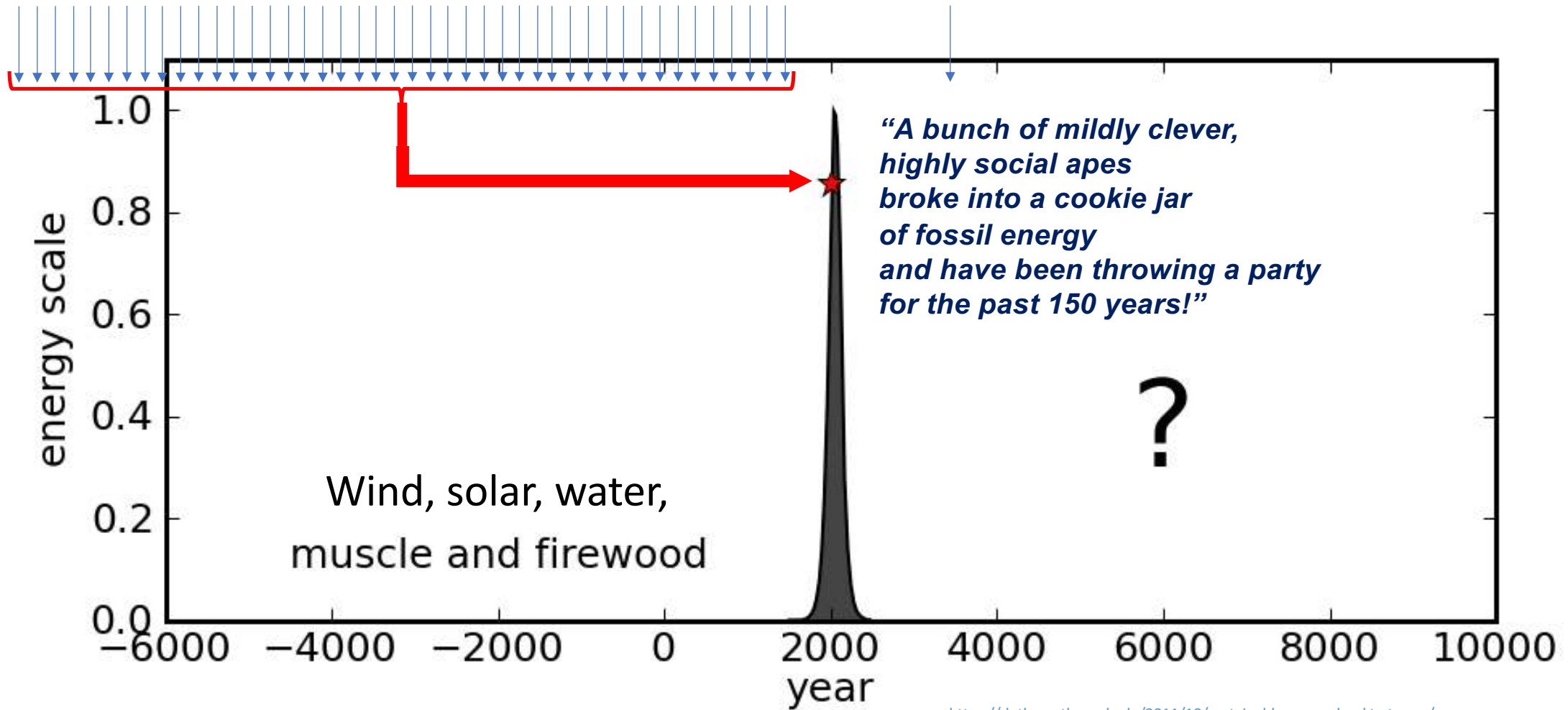


A KEY PROPERTY OF RENEWABLES: INTERMITTENCE



- VARIABLE SUPPLY
- ADAPTATION OF DEMAND
- STORAGE OF FINISHED GOODS

Simplified overview of our Reality : Current Solar vs Past Solar

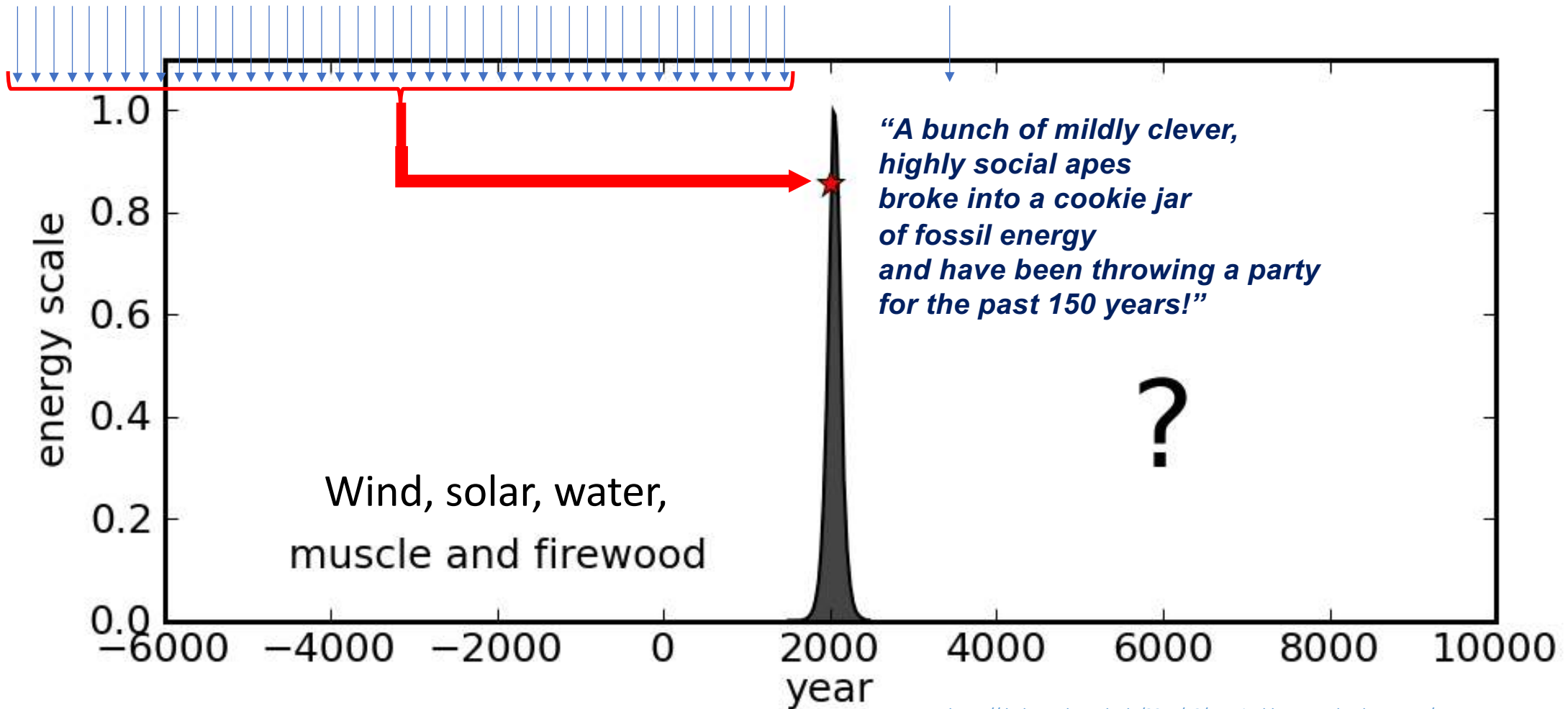


Simplified overview of our Reality : Current Solar vs Past Solar

PAST SOLAR (=fossil) is 500 mio years of condensed prehistoric photosynthesis / solar power – Half is now consumed!

Average ANNUAL Consumption : 250 mio years reserves / 250 years = 1 mio year past solar production / per calendar year

2016 consumption = 4.6 mio years prehistoric production (= 22x the time humans roam this planet)

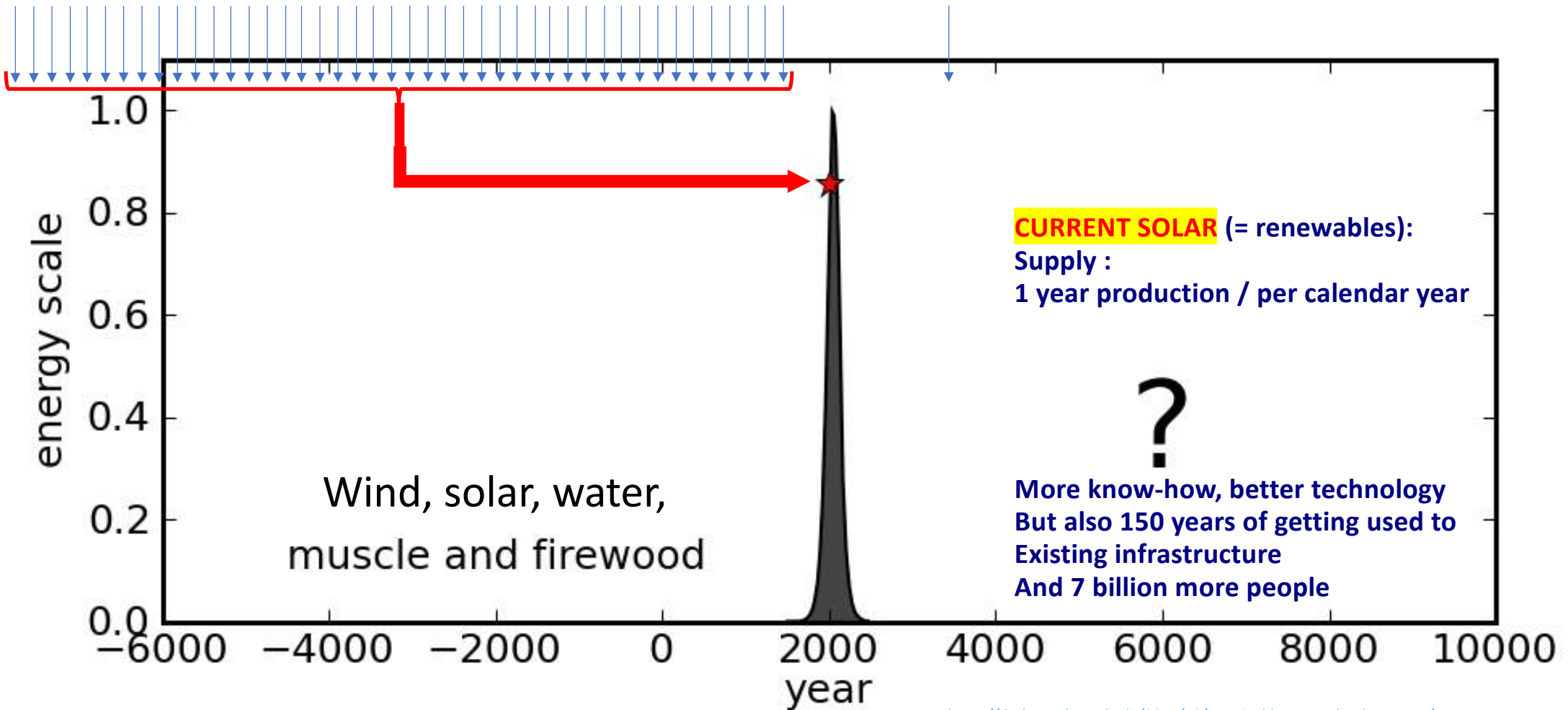


Simplified overview of our Reality : **Current Solar** vs Past Solar

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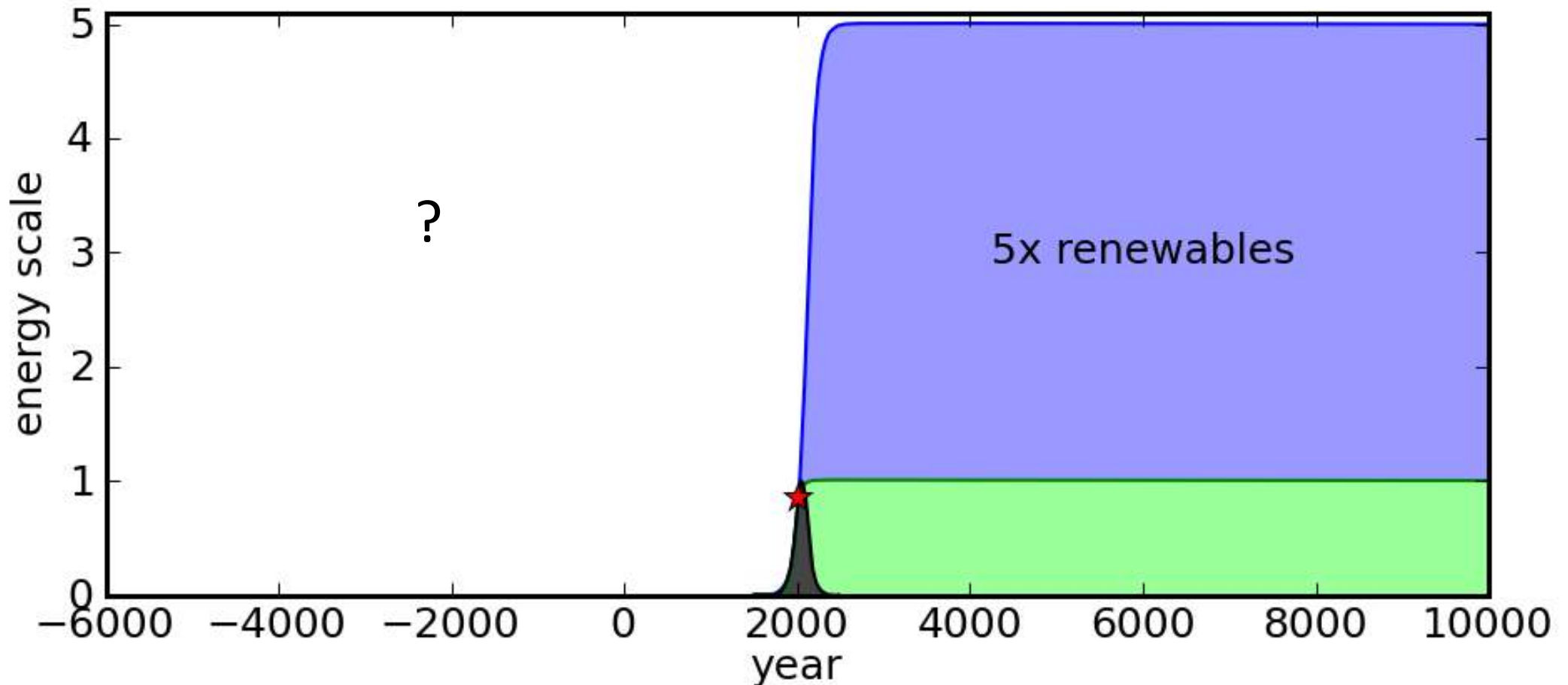
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2016 consumption = 4.6 mio years prehistorische productie (= 22x the time humans roam this planet)



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

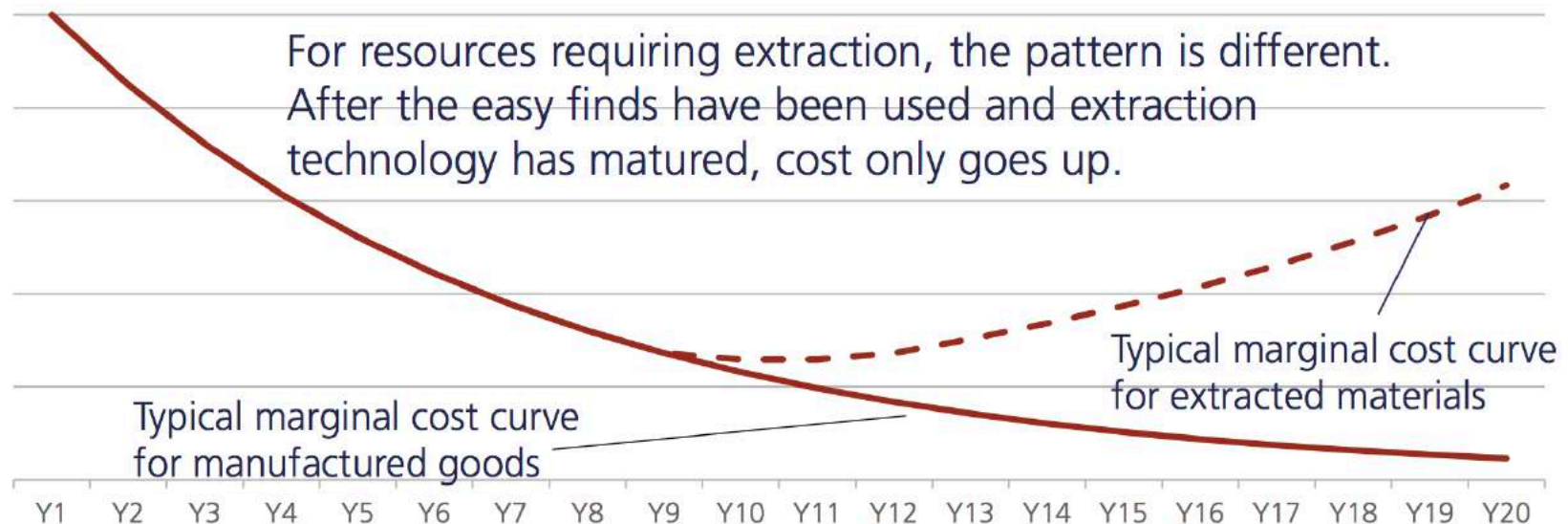
1. **Capacity & Production** is *not* the same – Renewable Energy is stochastic. Requires 5-10 units capacity for 1 unit produced output.
2. **Presence & Density** is *not* the same : Density determines economic availability (recycling requires energy too (cobalt, koper, etc)
3. **Chemical & Electric 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 **organise & pay for the storage**. This should be included in the energy scenarios, which often is forgotten.

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.





Chapter 3 - How energy and natural resources inhibit gro...

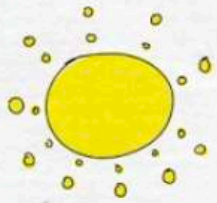


Watch later



Share

the story of almost everything (part 3)



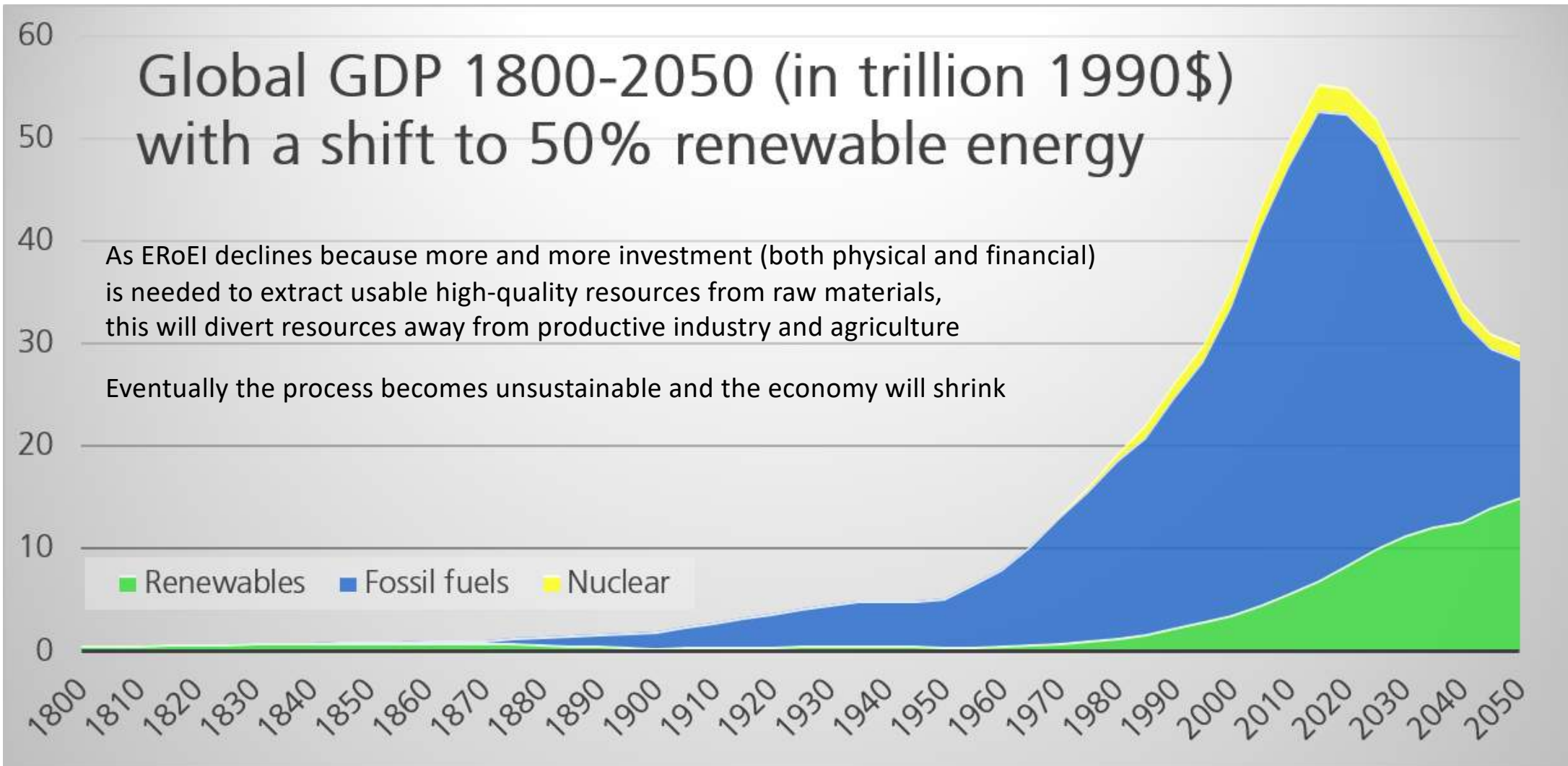
(why energy and natural resources make growth harder)



by: www.energyandstuff.org

https://www.youtube.com/watch?v=MKR925xz_R4

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



Economics vs. ecosystems science

Economic science

- Simplified models
- No integration of natural science
- Looks at recent history (200 years)
- Little to no interconnection between elements
- No/weak feedback loops outside supply/demand view
- No inclusion of breakpoints

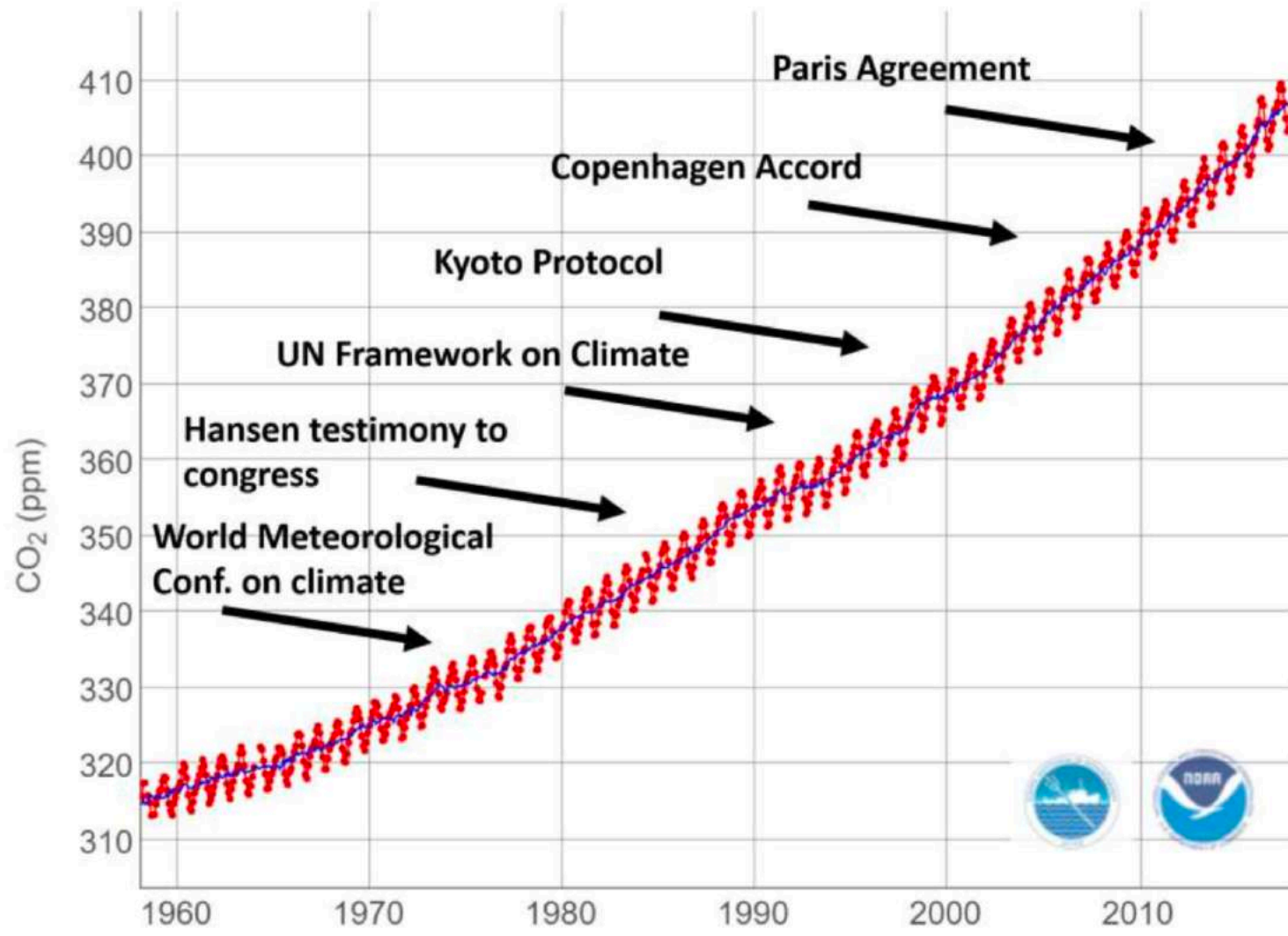
Ecosystems science

- Complex systems
- Integrates physics, chemistry and biology
- Includes long-term human ecosystem history
- Highly interconnected components
- Strong feedback loops
- Systemic failure risks accepted and integrated

In reality, our human economic system is nothing but a (very complex) ecosystem with many more parameters

Progress is the result of Actions. Not of Ambitions.

Mauna Loa Monthly Averages



1912 IBM Centenary 2012

Modeling
with 21st century
supercomputing power

Club of Rome Scenario

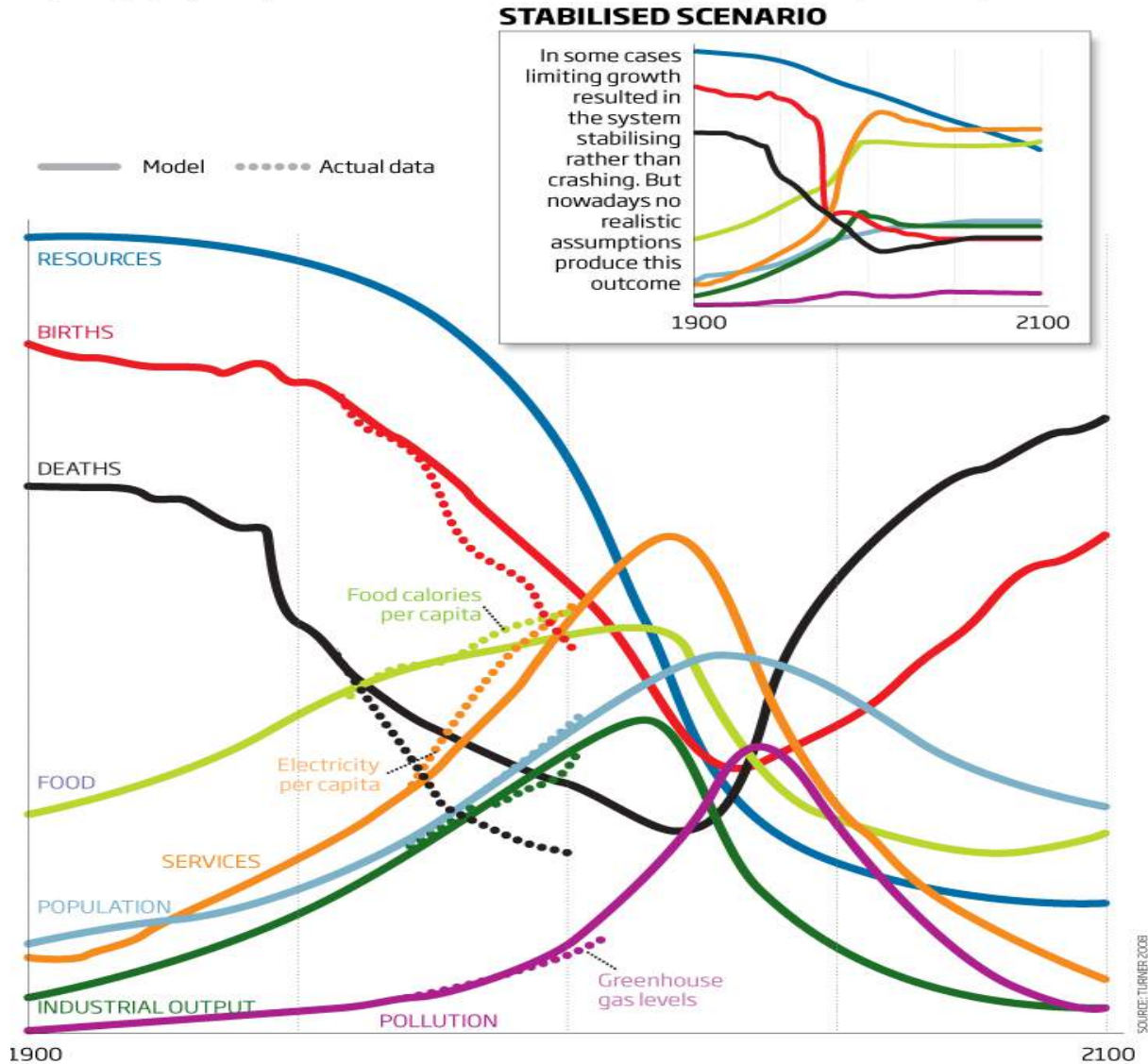
Note
Accuracy vs Actual data

Published in NewScientist

Boom and bust

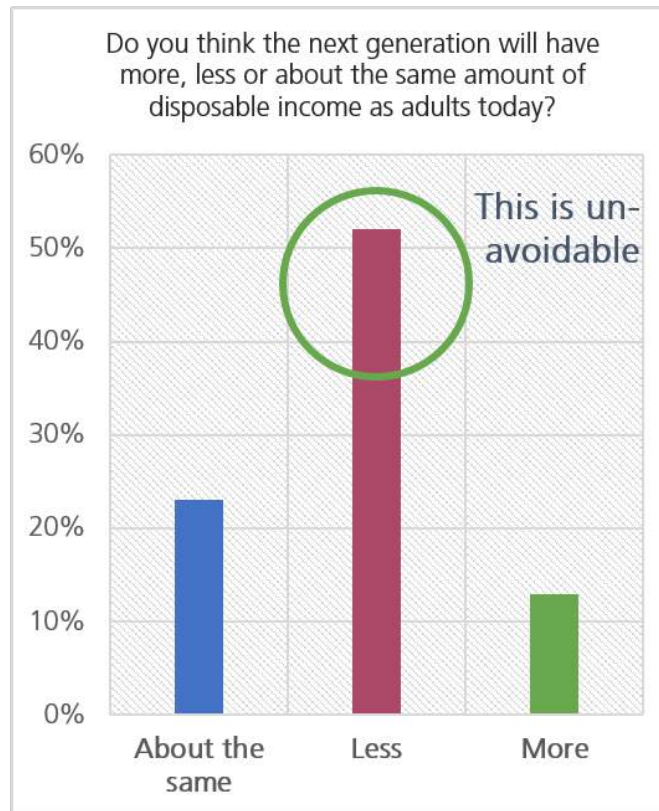
In most runs of the World3 computer model, rapid growth is followed by sharp decline. So far the standard run (main graphic) corresponds well with measurements of real-world equivalents (dotted lines)

©NewScientist

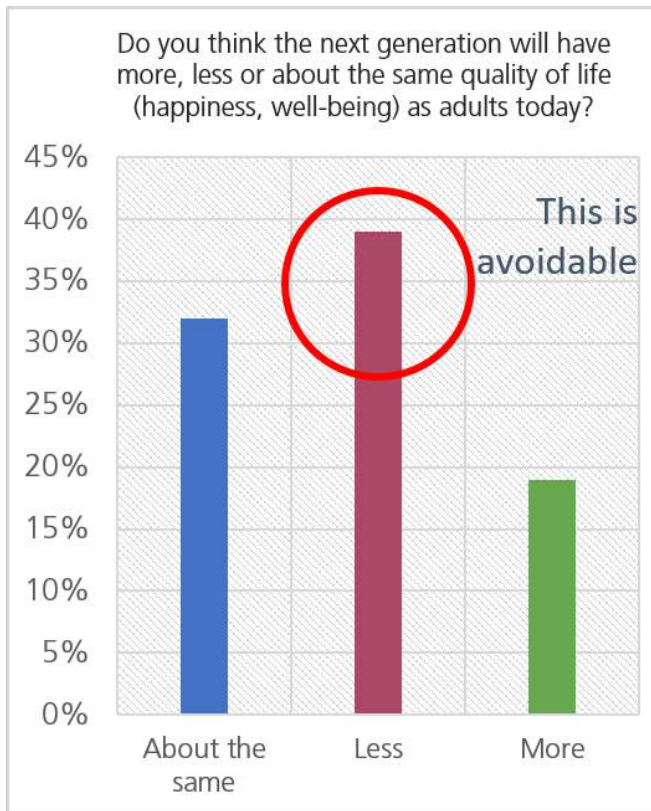


**We need to GET REAL ABOUT REALITY! & Realistic in our expectations
Nature is a mighty partner, not a slave**

IIER documents scientifically
what a majority already senses



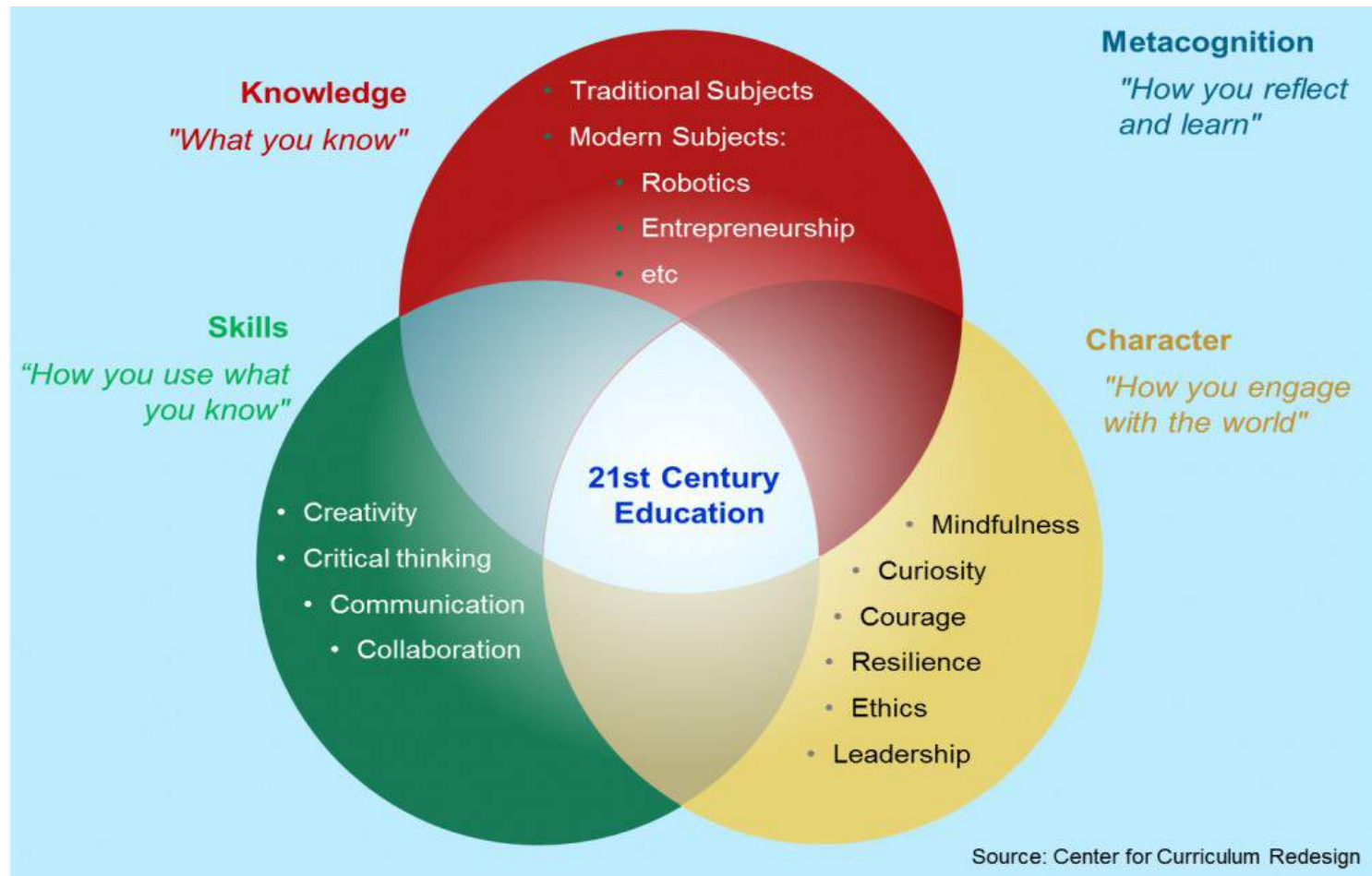
IIER works on ensuring that we can
still be happy with less material wealth



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

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

21st Century Challenges require 21st Century Education



hans@vanderloo.eu.com

We **educate** our **Young**...
...for **Jobs** that do not yet exist...
...to deal with **Problems** we are not yet **Aware** of !

How youth can thrive in the age of disruption

Flexibility is the Future

Disruption is accelerating

Digital Literacy & Media Literacy is Essential

it doesn't matter what you've done — it matters what you can do !



<https://youtu.be/7wy-aDoHtxw>



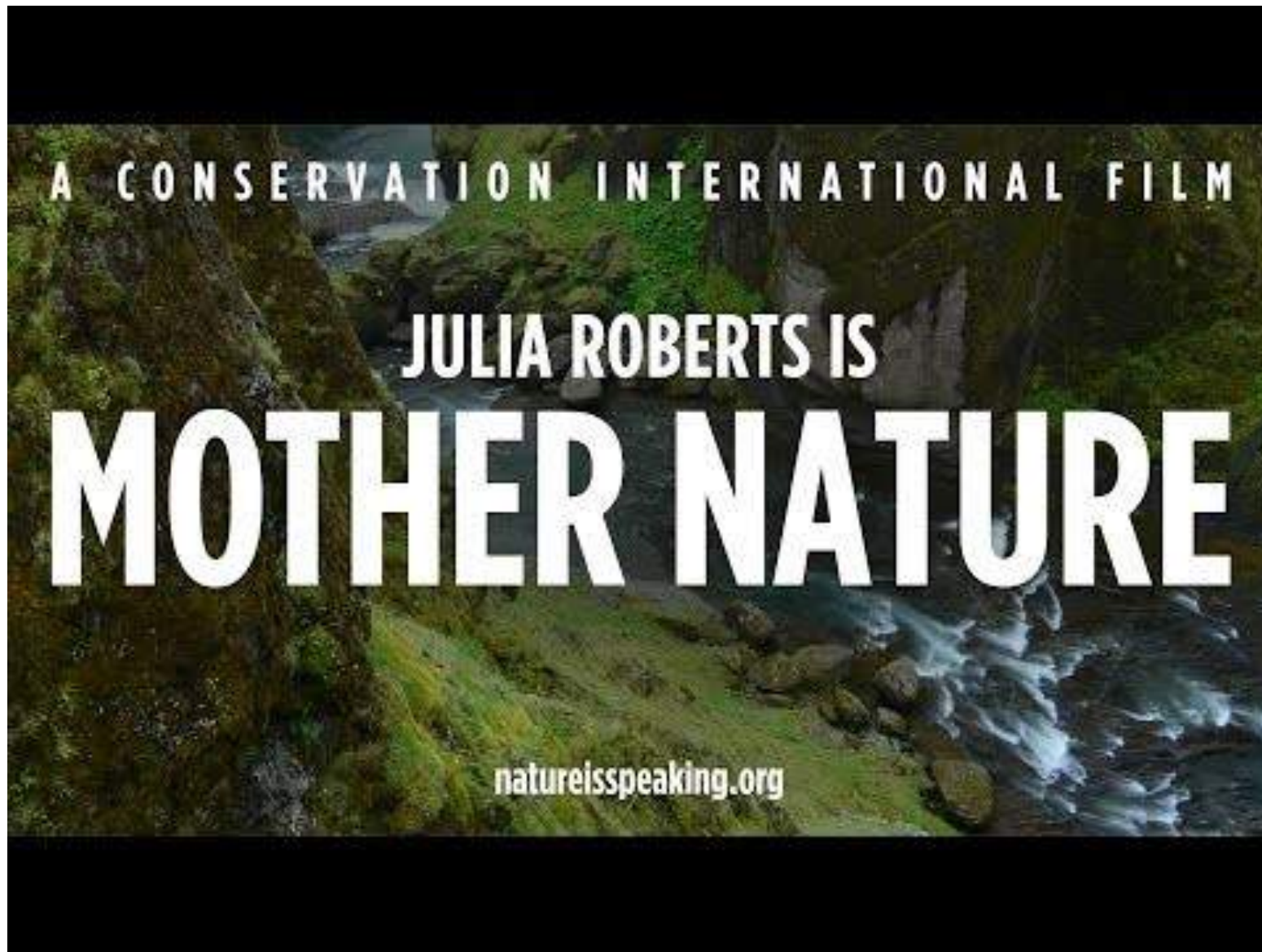
Result of spending billions on Education
In 2015 € ¾ Trillion (€ 725 billion)



IIER : 'Expert sparring partner'
for Business Leaders & Policy makers

OUR BIGGEST BLIND SPOTS :

- 1 - Demographics :** 1900 : 1 in 5 people were European 1 in 20 African. **2050 : 1 in 5 will be African & 1 in 20 (=5%) European**
EU small surface (renewables capture) but high economic DENSITY : **EU import dependency & Chinese Resource Colonialism**
- 2 - We think we know how to fly, but only as long there is fuel in the tank**
21st Century does NOT stand on its own legs : **based on abundant cheap energy from the past & cheap credit from the future**
- 3 - With conventional energy : Storage is Included & Free. With Renewables : Storage is NOT Included and quite COSTLY**
Reaching the other end of this century **in a civilized & peaceful way**, will require changes in policy & education
- 4 - Realistic & Futureproof Policies must be consistent with natural sciences & take into account behavioural sciences**



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

This (y)our only home ...



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

See things as they are, and wonder WHY?

Dream of things that never were, and wonder HOW?