

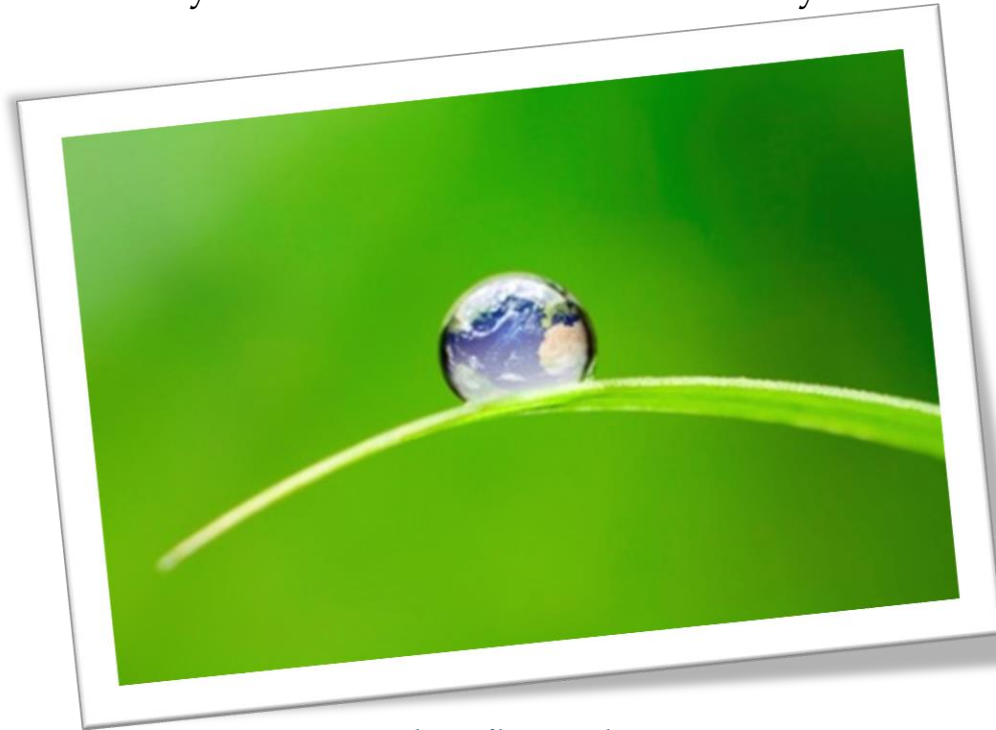


How I saved the World with a Newspaper and Some Exponential Thinking

(and how I prototyped it; with a little help from my friends Tuuli, Pablo, Catarina, Dina and Laura)

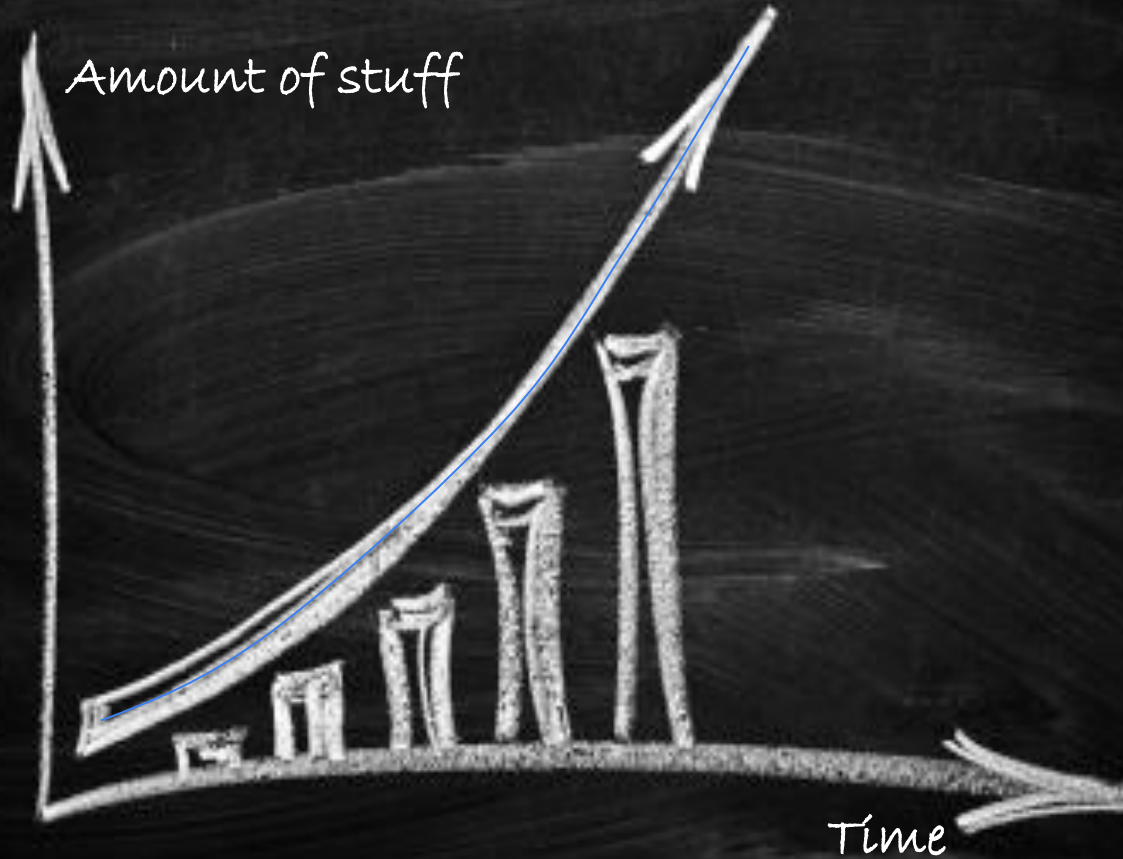
Why would you be interested in “exponential”?

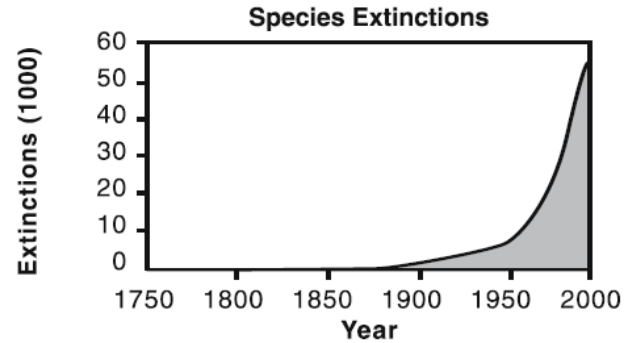
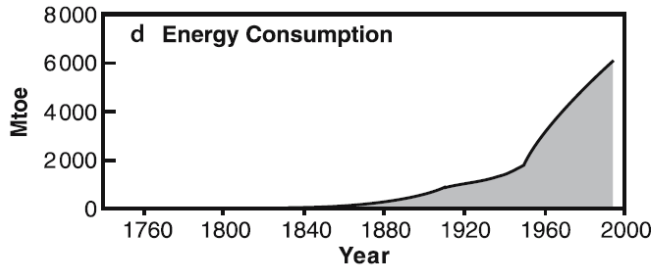
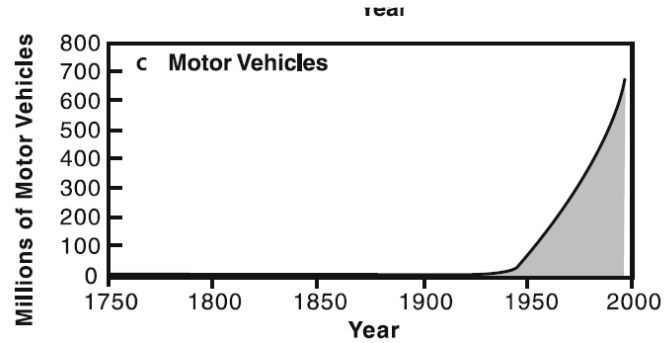
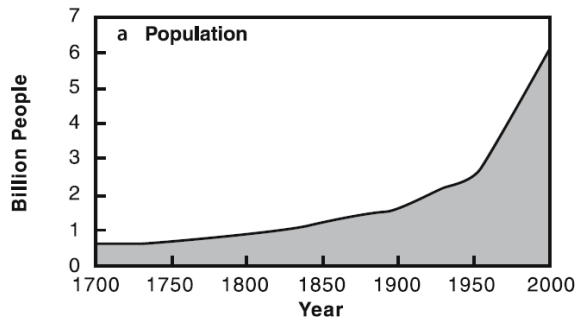
Because you are interested in “sustainability”



Let's briefly explore

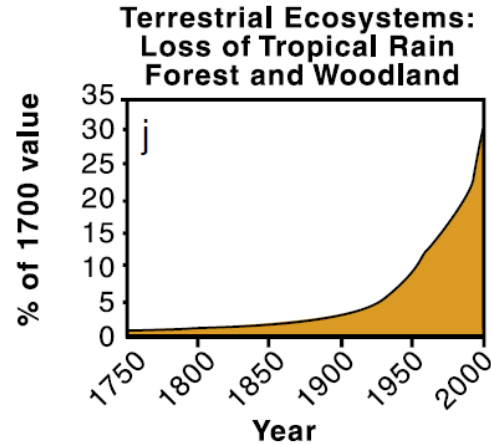
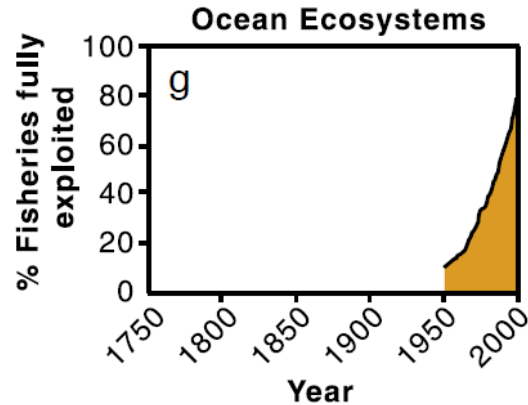
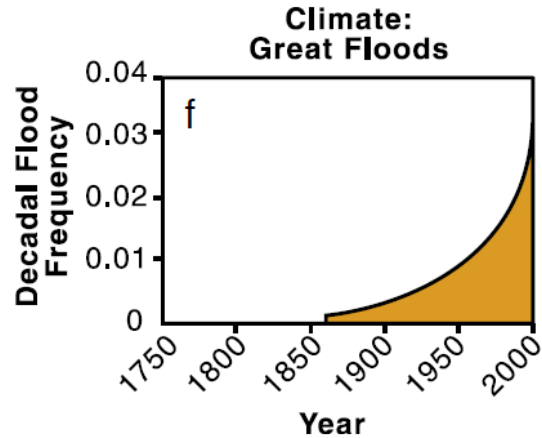
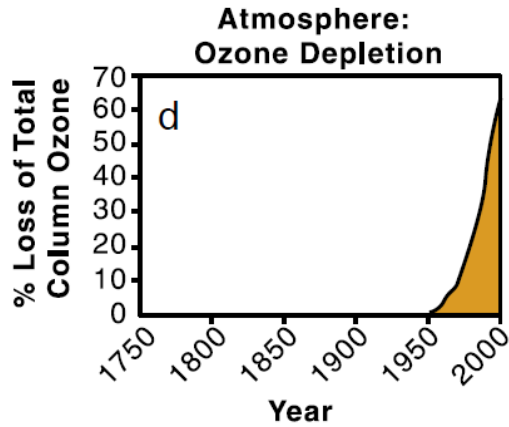
How does exponential growth looks like?





Source:

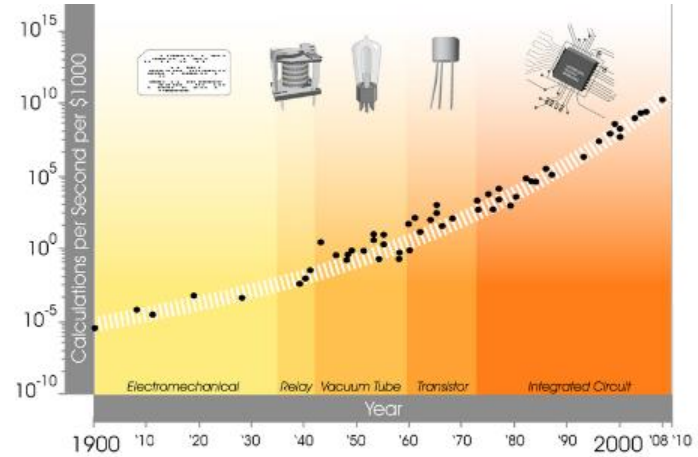
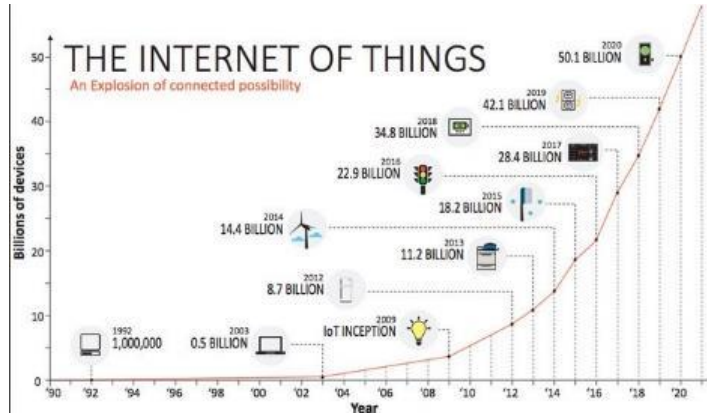
“Global Change and the Earth System: A Planet Under Pressure” (2004), W. Steffen, et al., Springer-Verlag Berlin Heidelberg New York.



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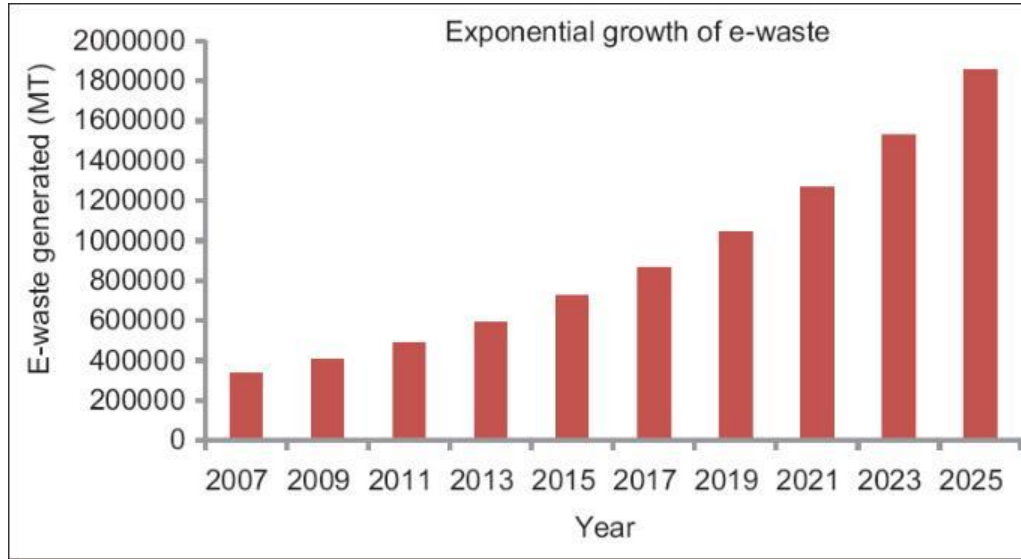
“Global Change and the Earth System: A Planet Under Pressure” (2004), W. Steffen, et al., Springer-Verlag Berlin Heidelberg New York.

Technology seems to grow exponentially...



Internet of Things: online guide to the Internet of Things, <http://www.i-scoop.eu/internet-of-things/> and <https://exponential.singularityu.org/>

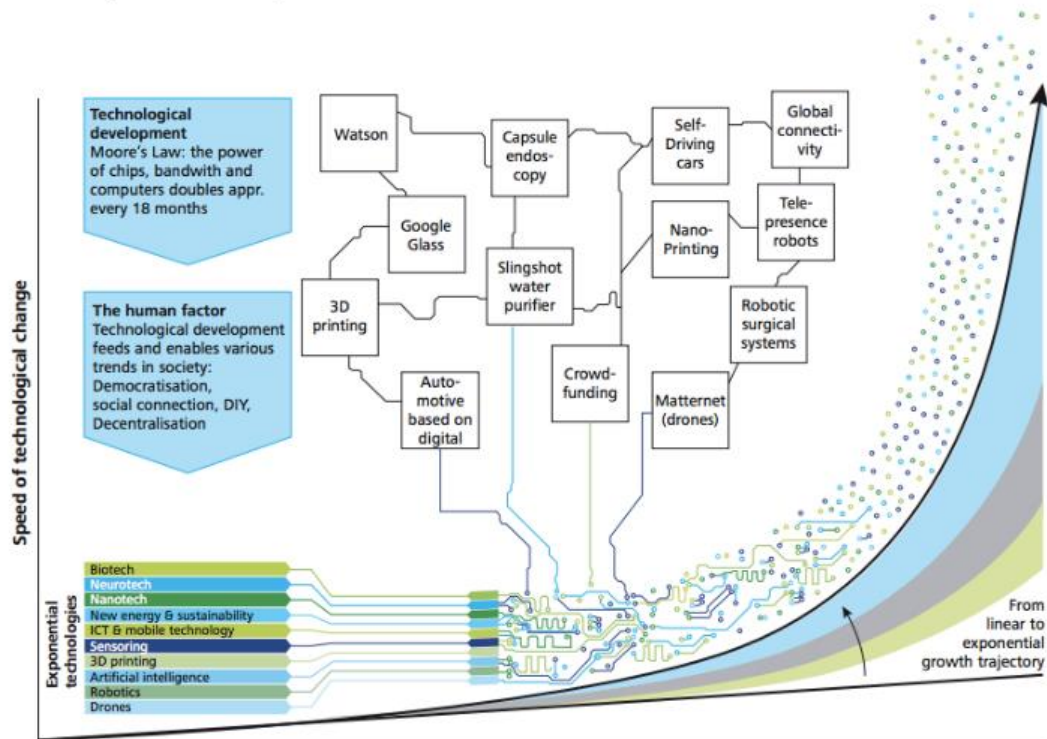
...but this doesn't come for free...



(India figures)

J. Annamalai, *Occupational health hazards related to informal recycling of E-waste in India: An overview*, *Indian Journal of Occupational and Environmental Medicine*, Vol. 19, No. 1, January-April, 2015, pp. 61-65.

As well as the way several technologies are converging, adopted and the possibilities they may bring...



Source: Deloitte 4.0 report 2015

<https://www2.deloitte.com/content/dam/Deloitte/ch/Documents/manufacturing/ch-en-manufacturing-industry-4-0-24102014.pdf>

Income & Employment: How can we fix this?

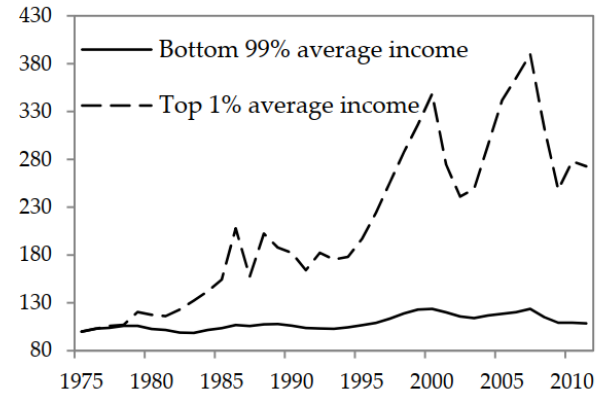
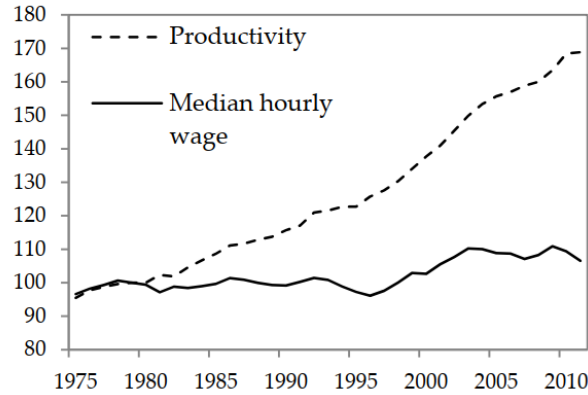


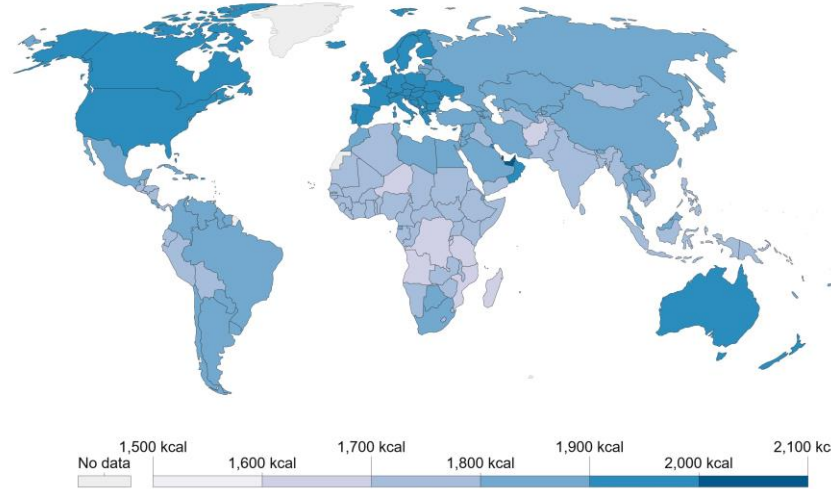
Figure 1 – Wages, productivity and average incomes in the US (1975-2013)
Sources: 'The State of Working America, 12th ed.' by the Economic Policy Institute (left panel); T.Piketty and E.Saez (right panel)

Energy vs. Food: How can we fix this?

Minimum daily requirement of calories, 2020

The minimum amount of daily dietary energy per person that is considered adequate to ensure they maintain a minimum weight for health. Across a population, this takes factors such as the age, sex, height, and activity levels of different individuals into account.

Our World
in Data



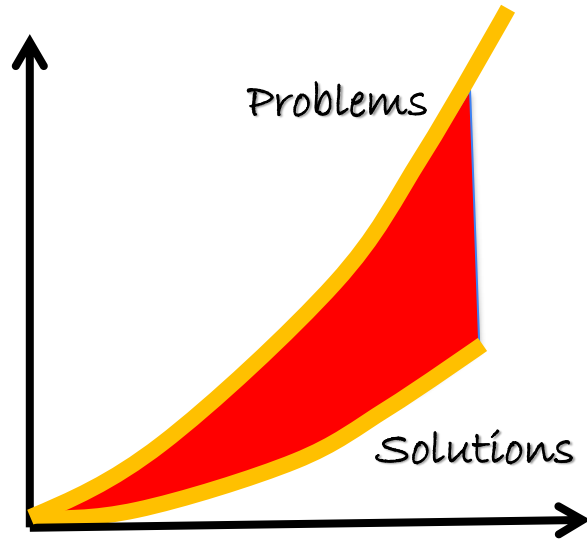
Source: Food and Agriculture Organization of the United Nations

OurWorldInData.org/hunger-and-undernourishment • CC BY

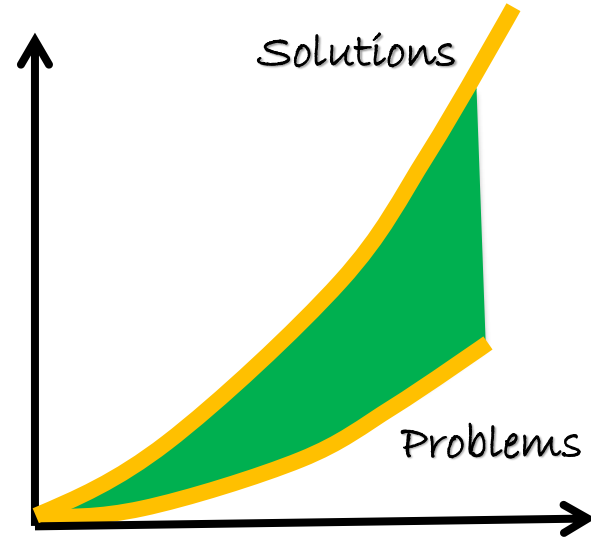
Annual world energy production: 6×10^{20} J. Minimum average yearly food (energy) need for 8b people: $\sim 5 \times 10^{19}$ J ... Close...

Source: [Our World in Data](https://ourworldindata.org)

Conclusion: We hope humankind will follow the right path...



Law of increasing ignorance



Law of increasing wisdom

Why do we need to think this way?

Many of our problems are due to small scale thinking & not seeing the big, long term picture and systemic effects.



... & unintentional consequences

Zooming out from your project to a
helicopter view

= order(s) of magnitude bigger



Example: “We want to change the basic approach to eliminating waste in order to make it fully re-usable.”

This will affect the lives of +4b people by scaling up waste management to an individually recyclable level.”

We go for the next step!



Idea

Prototype

Today

"XS"

entangled pair

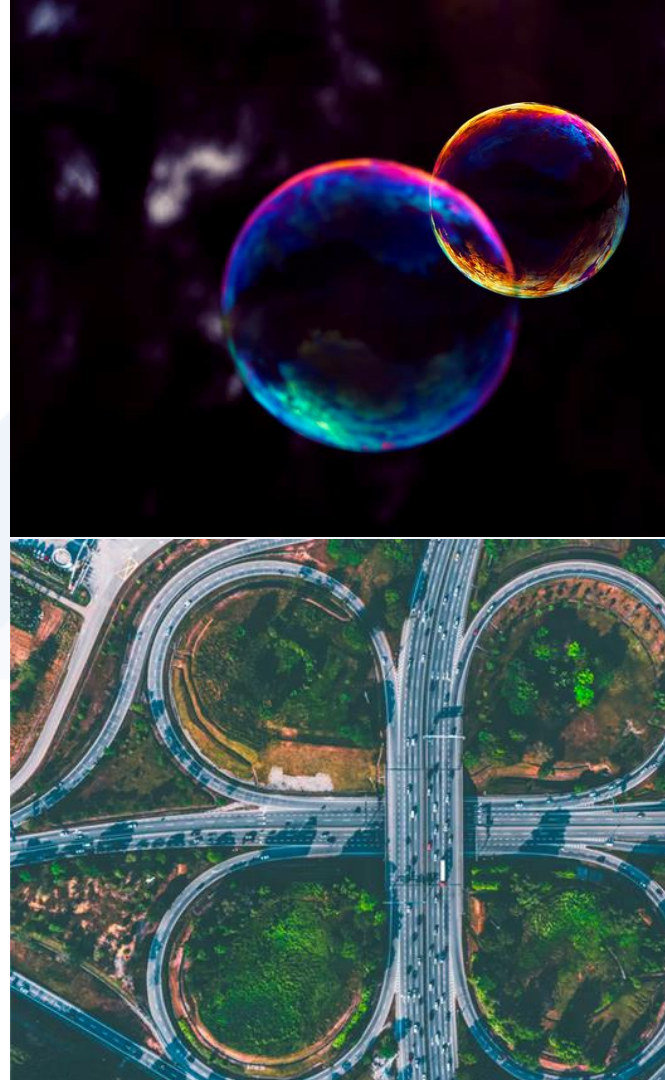
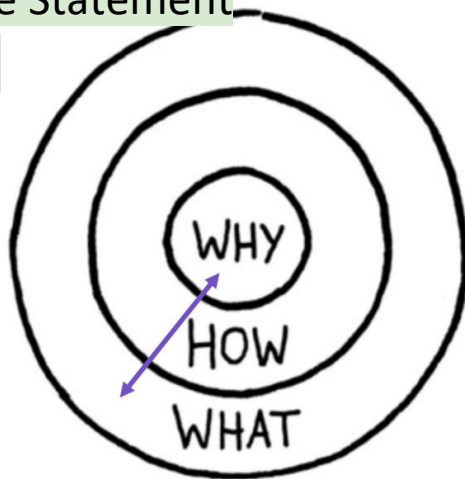
← BACKCASTING

Vision

Change Statement

Future

"XL"



Ultimate Survival Story: Shelter on the Moon for everyone!



What is the cheapest way (resources, energy) to get to the Moon?

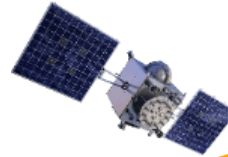


1. Take a piece of paper.
2. Start folding it in half each time.

What is the cheapest way to get to the Moon?

45 folds ~ Congratulations,
you have reached the Moon!

40 folds
~ GPS satellite orbit



30 folds
~ Altitude of planes



25 folds
~ Empire State
Building



Folding increases thickness
exponentially



Prototyping Exercise

- Make (a) conceptual prototype(s) related to your proposed ultimate change solution
 - *It can be a product, service, vision, dream ...*
 - *Needs to affect +4b people*
 - *Needs not be feasible (i.e. needs not be a proven concept to work, can be abstract)*
 - *(Just please do not break the fundamental laws of physics e.g. conservation of energy)*
 - *You have 2 hours*
 - *You must have Fun*
- 