
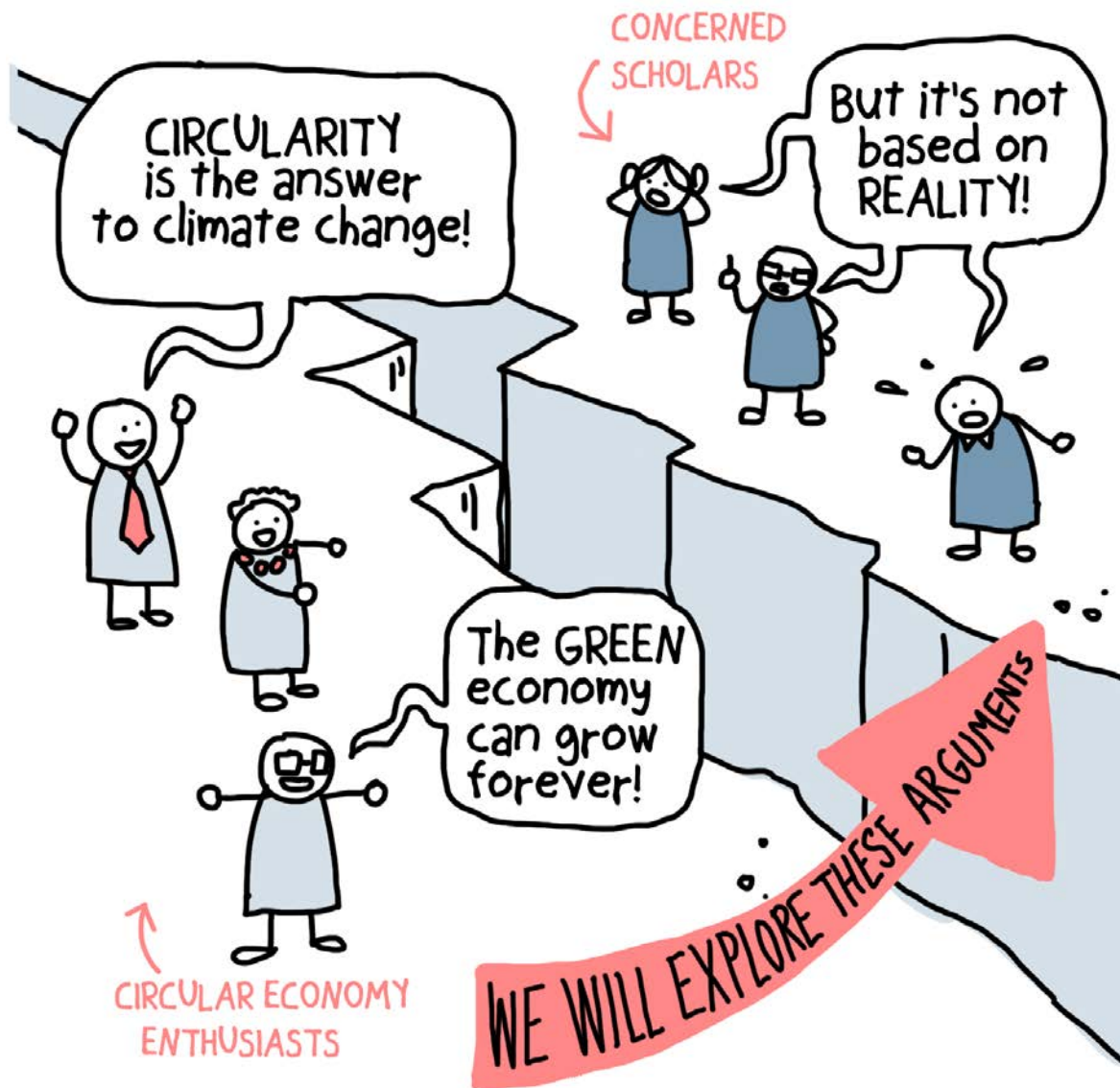


THE  
IMPOSSIBILITIES  
OF THE  
CIRCULAR ECONOMY



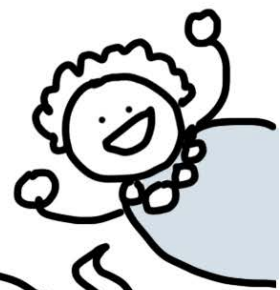
CIRCULARITY IS A HOT TOPIC.  
BUT THERE ARE MANY ISSUES WITH IT.



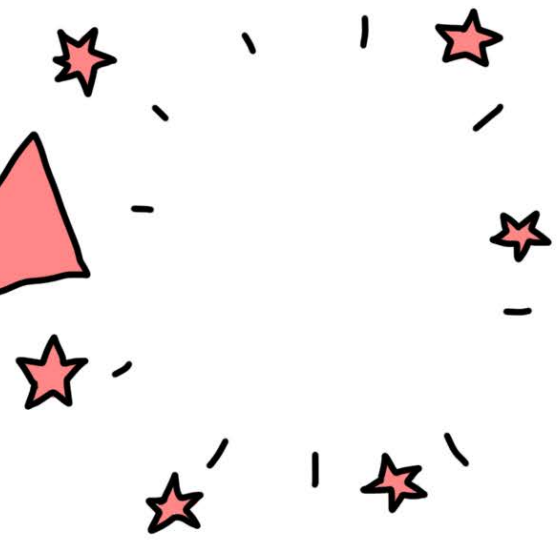
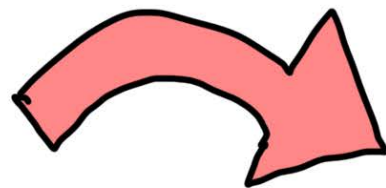
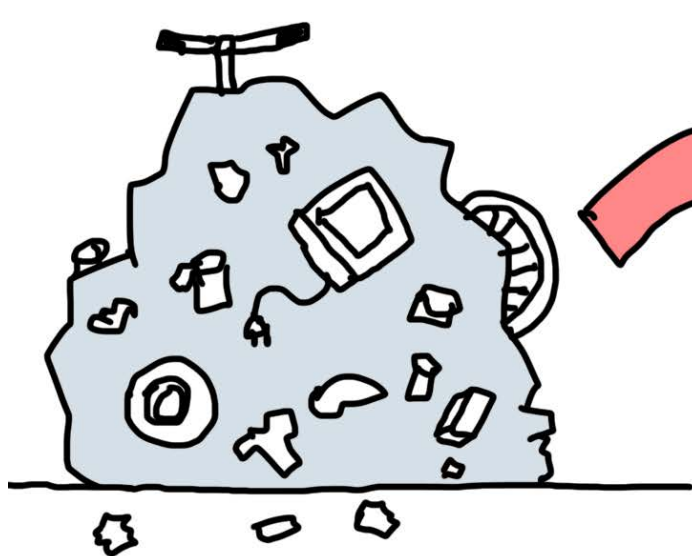
# THE LURE OF CIRCULARITY IS STRONG....



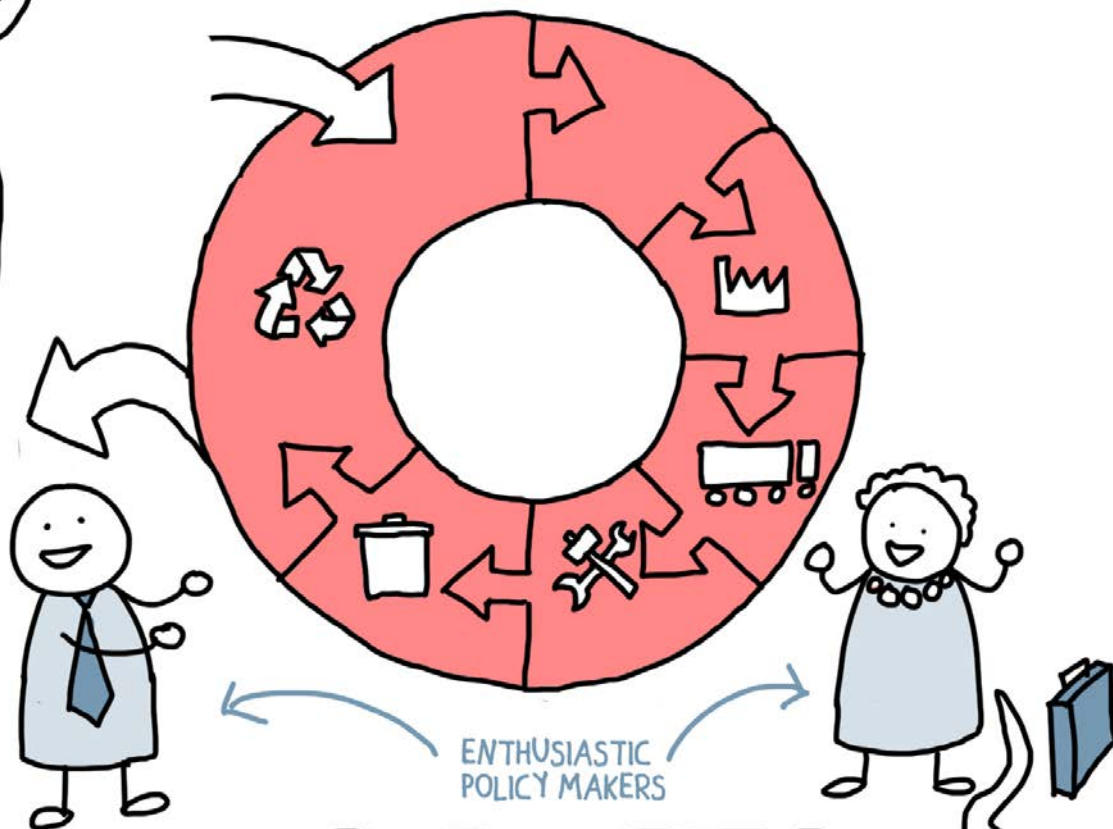
Waste becomes a resource!



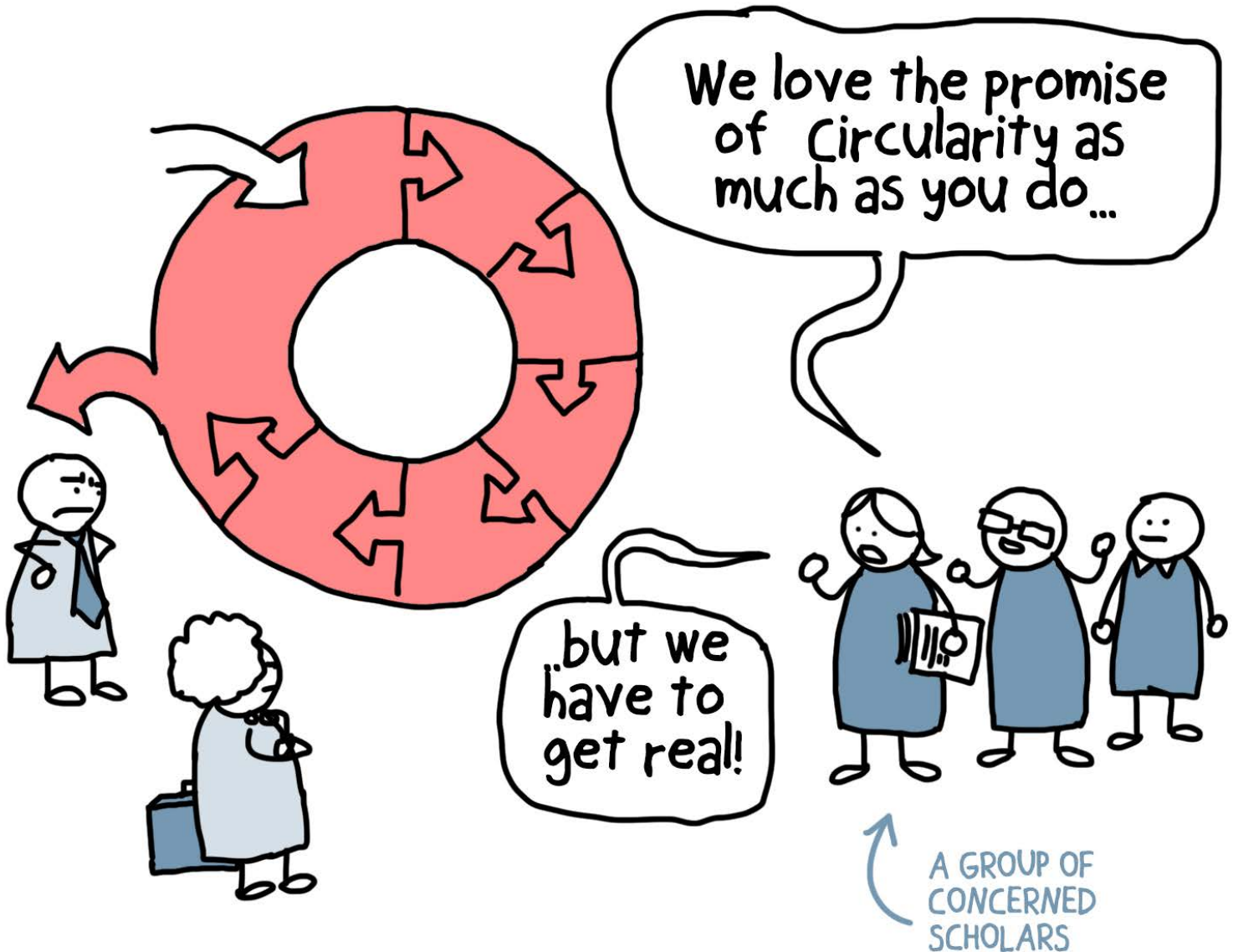
It's magical:  
Waste ceases to exist!



The economy can keep on growing since the growth is GREEN!



Business can actually profit from being ecological!



We love the promise of circularity as much as you do...

but we have to get real!

A GROUP OF CONCERNED SCHOLARS



The CURRENT CONCEPT has  
MASSIVE FLAWS. For example the

# SCIENCE

Prove it!

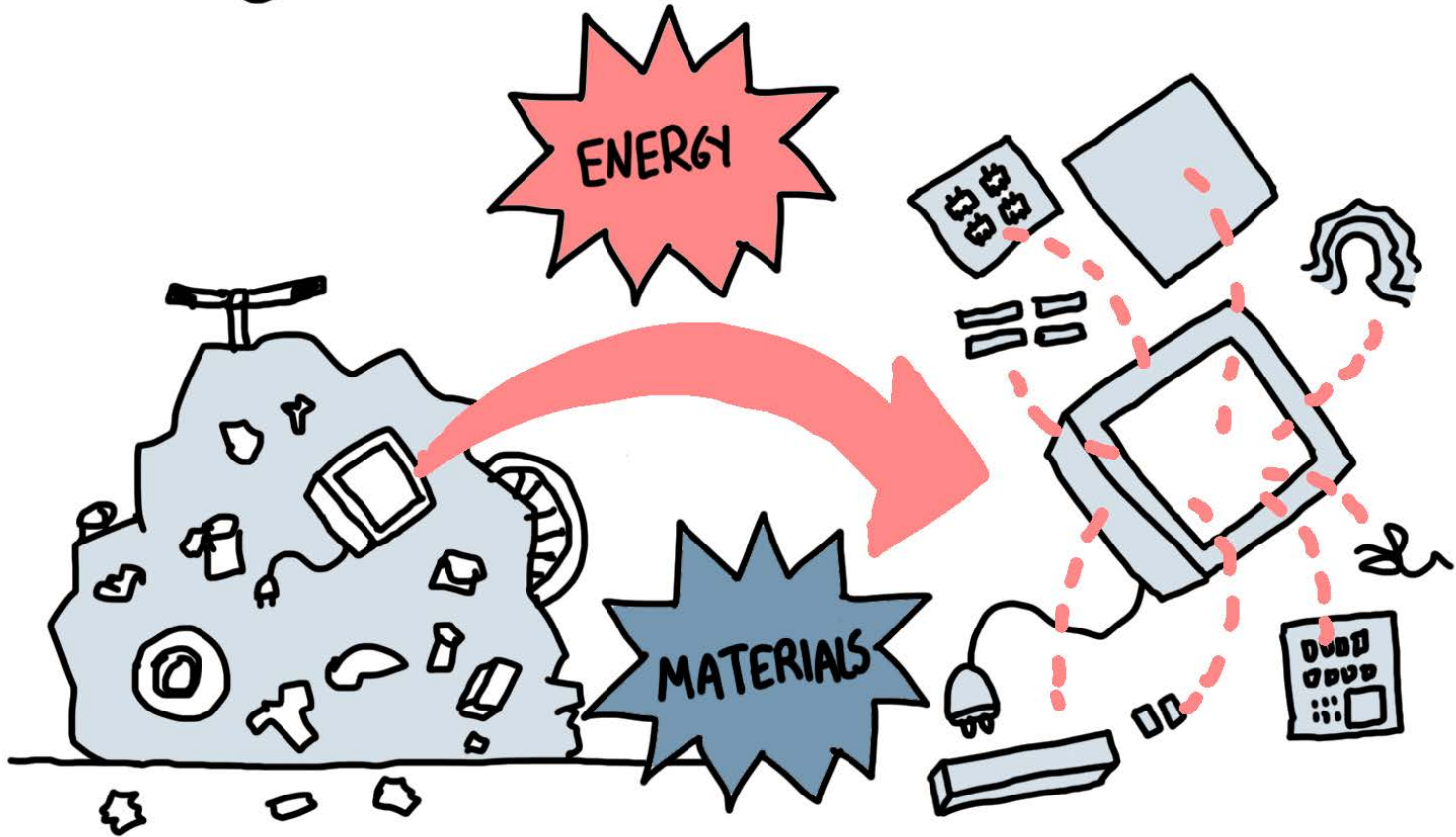




**ENERGY &  
MATERIALS**

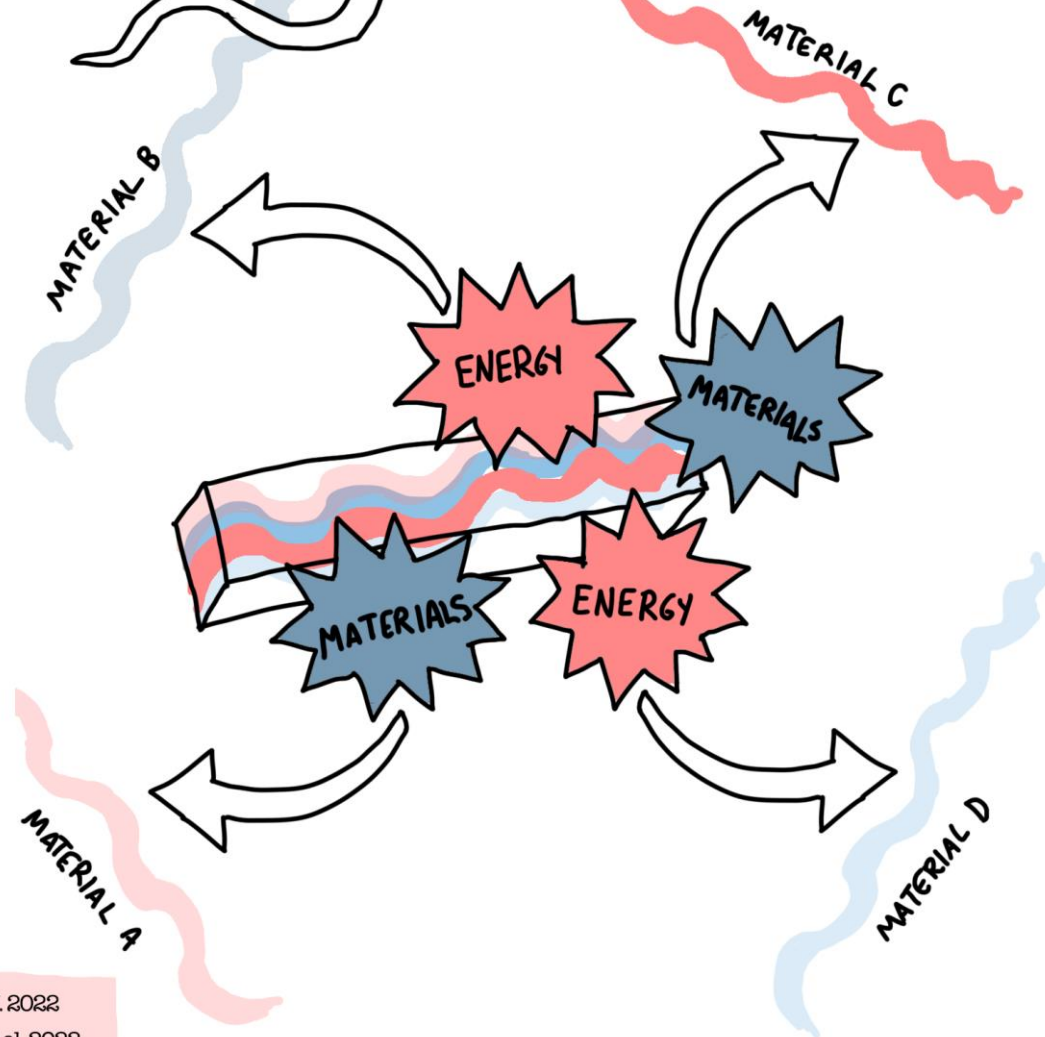


It takes a lot of energy AND materials to reuse materials. The irony!





It's worth remembering that a lot of materials these days are alloys and blends. It's very energy and materials intensive to separate these.

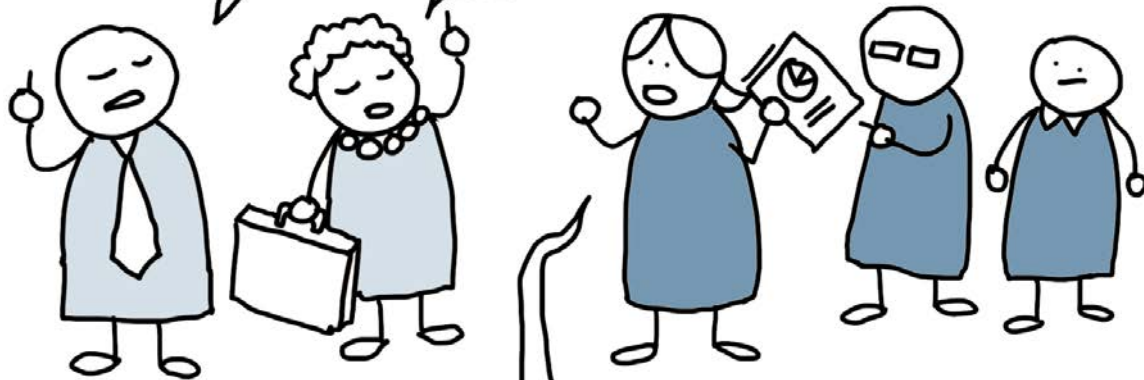


▶ Huether, J. 2022

▶ Vahle, T. et al. 2022

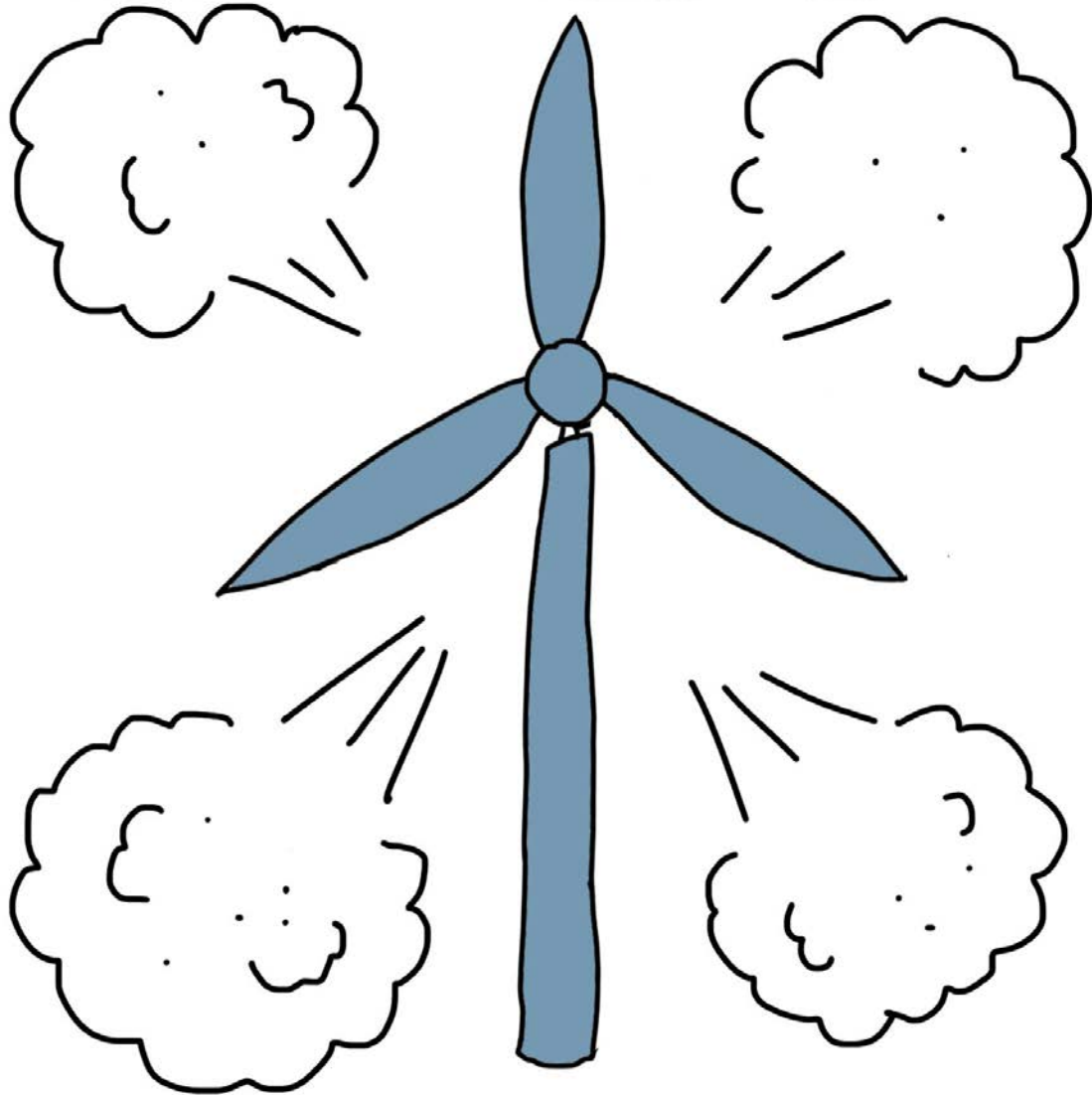


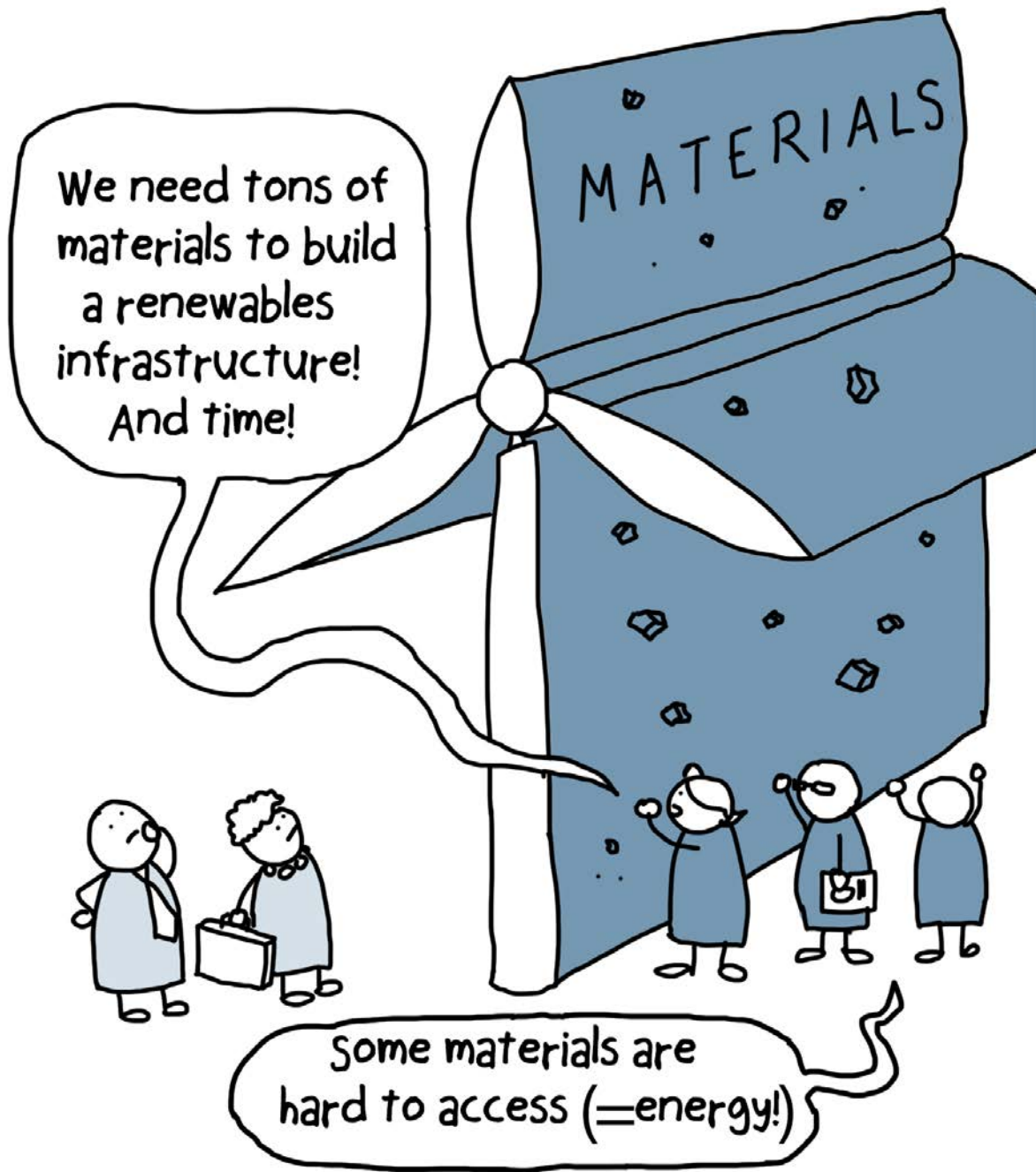
You forget that in Circular Economy all energy comes from RENEWABLES!



Theoretically yes. In reality no.  
We don't have enough natural resources to build the infrastructure at speed and scale.

Renewables infrastructure does not magically materialise out of thin air.





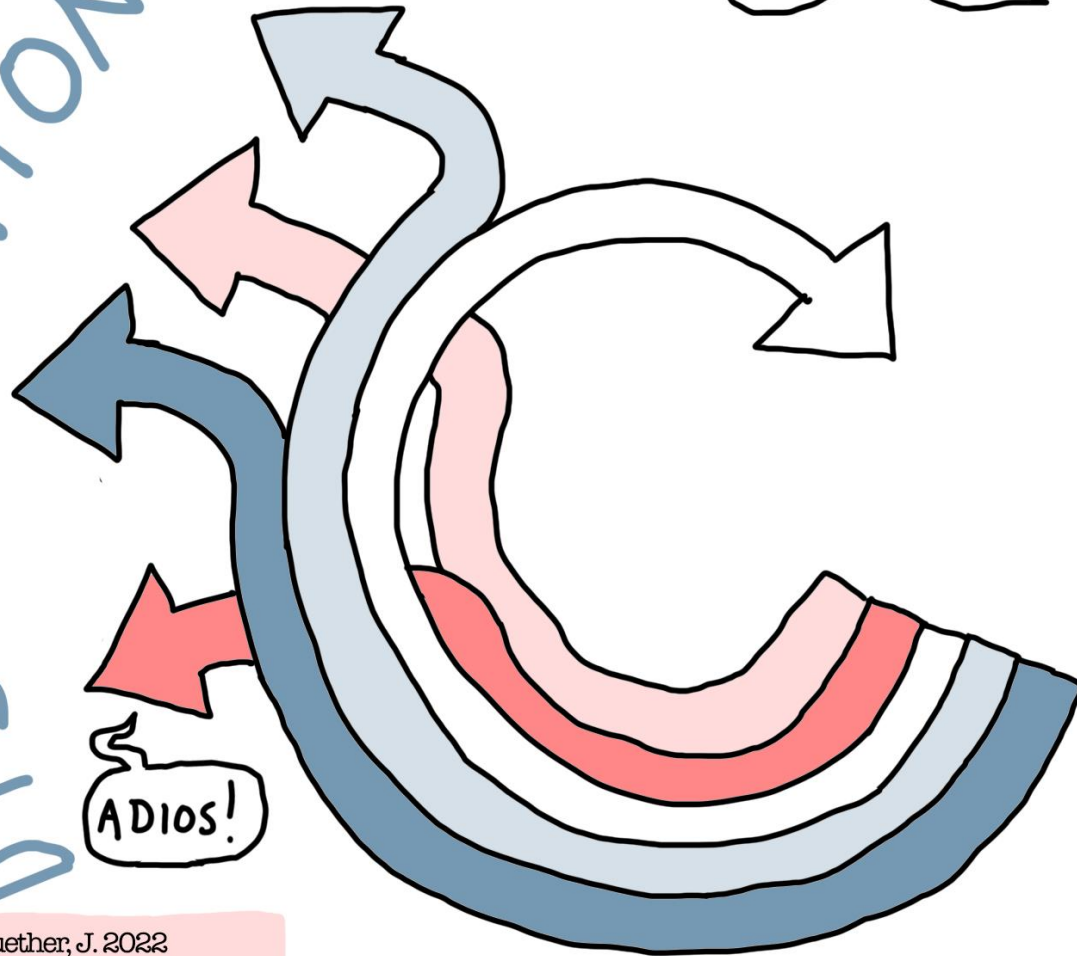
We need tons of materials to build a renewables infrastructure! And time!

MATERIALS

Some materials are hard to access (=energy!)

At every stage some materials will be lost permanently.

DISSIPATION



ADIOS!

- ▶ Huether, J. 2022
- ▶ Strand, R. 2022
- ▶ Sverdrup, H.U. et al. 2022



IF the economy keeps growing  
the Earth simply does not have  
enough RAW MATERIALS  
-Circular Economy or not.



Sverdrup, H.U. et al. 2022

Dahm, D. 2022

**ORGANISATIONS**



▶ Gonsler, M. Hinske, C. 2022

▶ Beehner, C. 2022

▶ Thomaz, L.F. et al. 2022

▶ Ritchie-Dunham, J. 2022

The silo issue is a problem even in academia

Talk to economists?  
It's not even a real science!



Talk to physicists?!  
I study human behaviour!

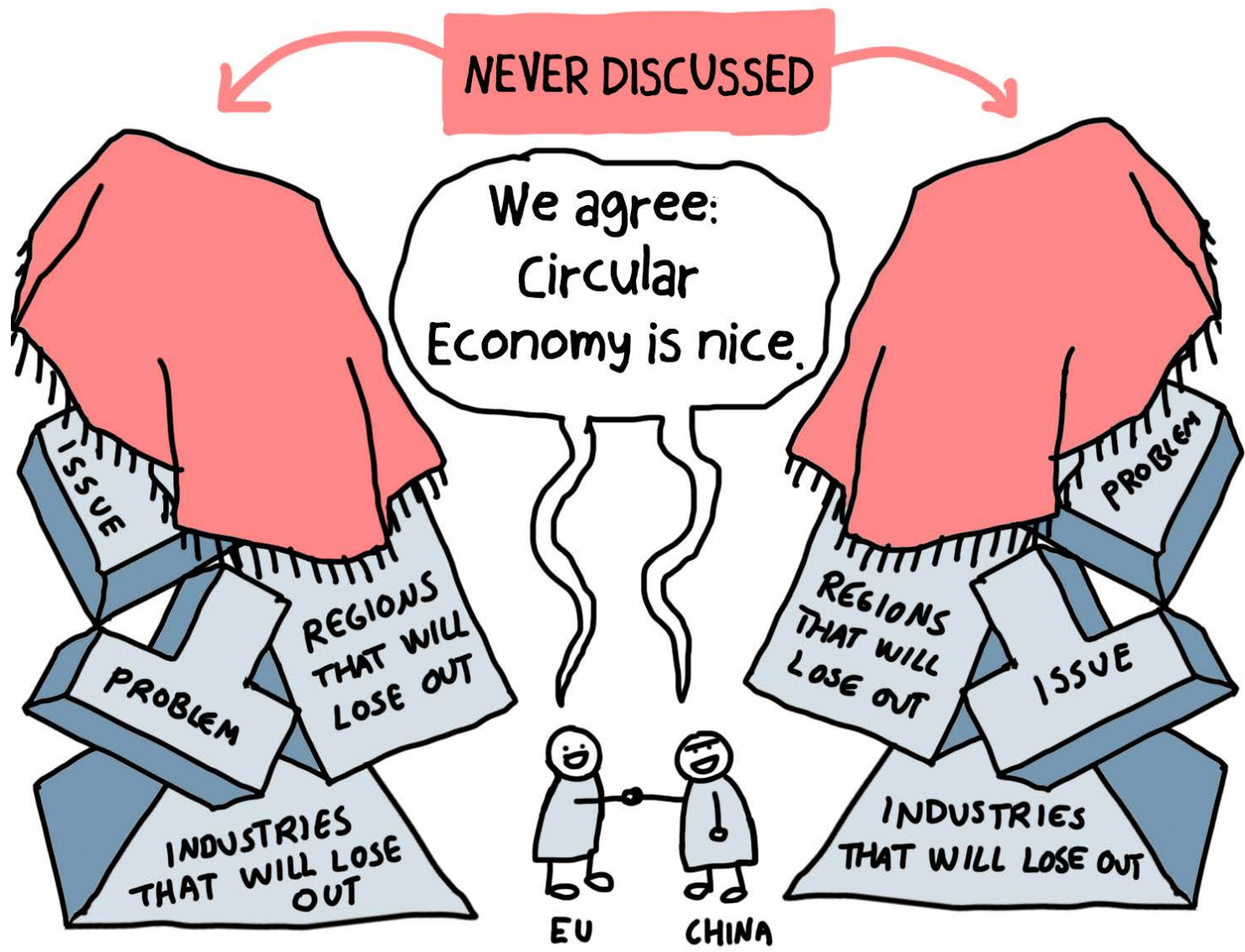


Talk to biologists?!  
But I study material flows!



**POLITICS**





**ECONOMICS**

At the heart of the matter is that unlimited growth is NOT possible in a limited space that is our planet.



▶ Semertzidis, T. 2022

▶ Hoomans, S.  
Welp, M. 2022

**Club of Rome 1972:**

"The global system of nature in which we all live – probably cannot support present rates of economic and population growth much beyond the year 2100, if that long, even with advanced technology."

We need a much SMALLER and regenerative global economy in order to keep our planet sustainable.



▶ Semertzidis, T. 2022

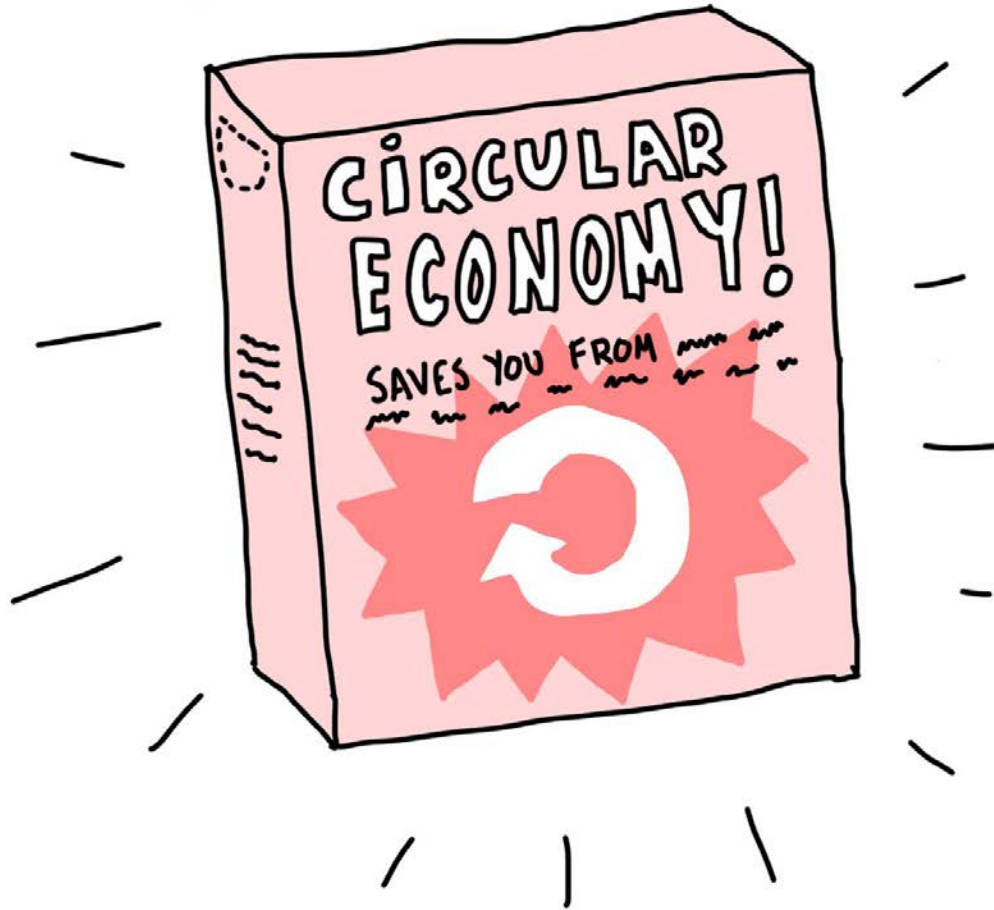
▶ Hoomans, S.  
Welp, M. 2022

▶ Dahm, D. 2022


### **Factor X**

The use of natural resources must become x times more intelligent and efficient. The name Factor X (originally Factor 10, which meant that industrial nations should aim for 90% reduction in materials use) implies that huge resource efficiency potential exists in many areas of production and consumption which so far has largely remained untapped.

In short, the Circular Economy concept has become misleading and potentially dangerous fluff!







Are you saying  
we should abandon  
Circular Economy?!

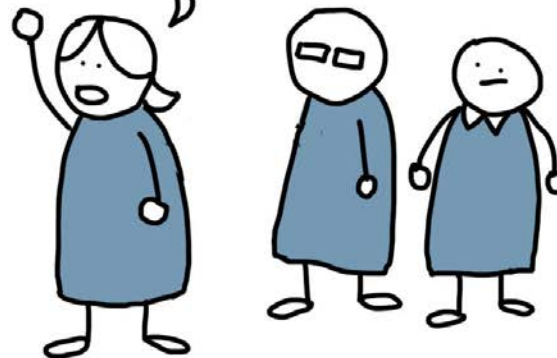
Absolutely not!

THE ANSWER IS  
*Circular Economy*

What do you suggest then?!



Let's first of all forget the silver bullet thinking.

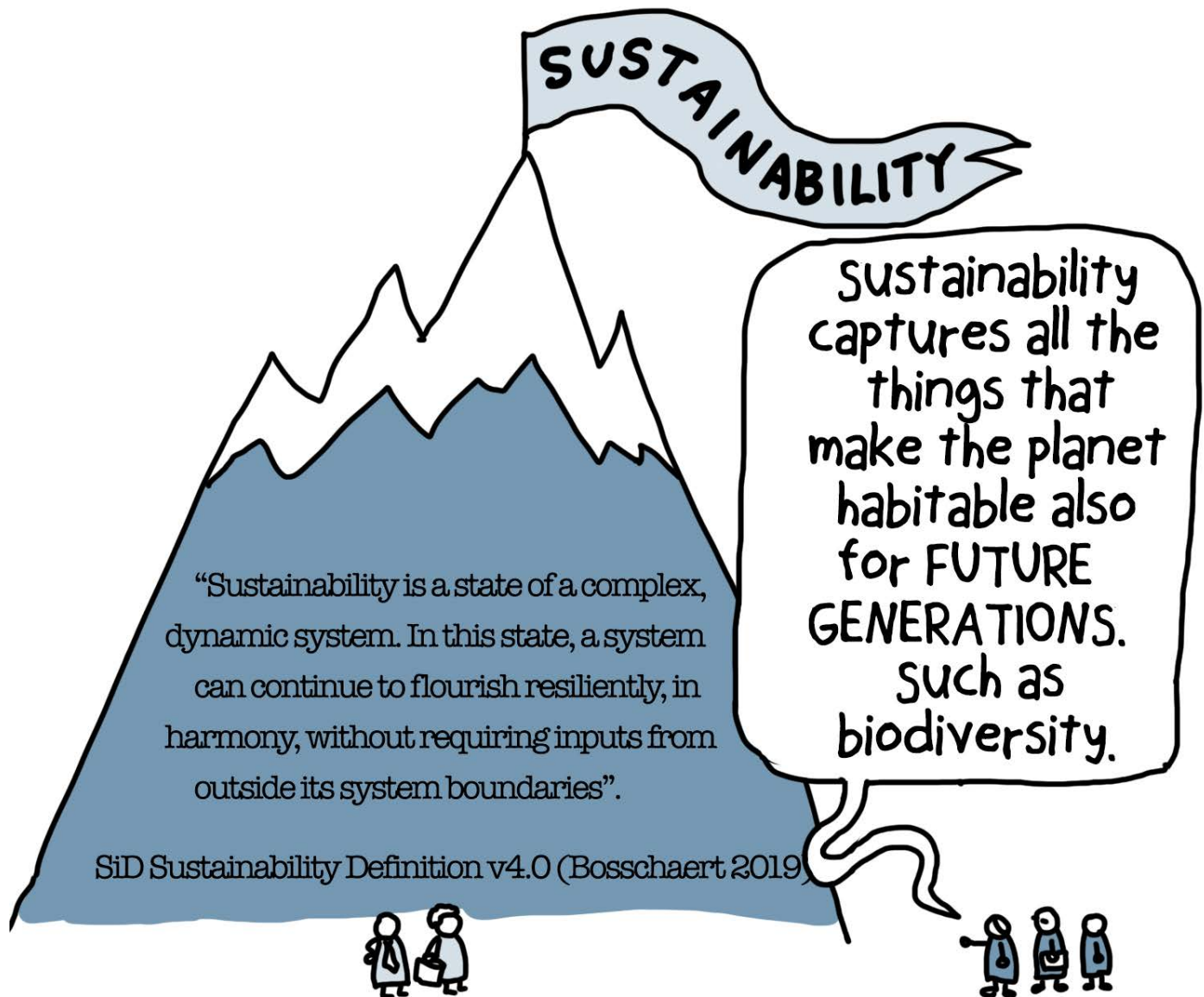


Our ultimate GOAL should be the  
REGENERATION of our planet through  
SUSTAINABILITY.

CIRCULAR  
ECONOMY

Circular Economy  
is a tool to get  
there.

REGENERATION



SiD Sustainability Definition v4.0 (Bosschaert 2019)

Mainstream Circular Economy thinking also misses social aspects of going "circular".

It's amazing how little Circular Economy has lowered our standard of living!

Cheers to that!



▶ Doeland, L. 2022

▶ Frieger, H., Kuemmerer, K. 2022

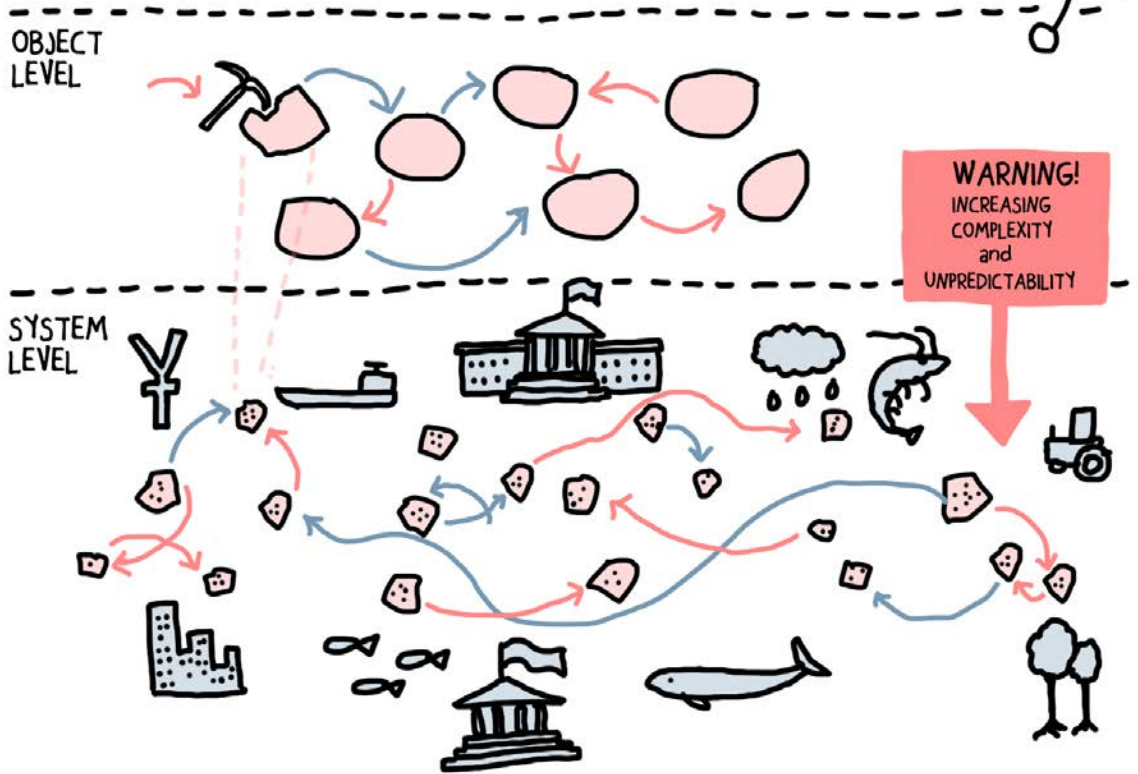
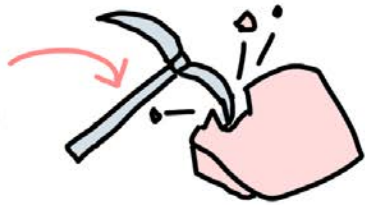
▶ Vosse, C. 2022

▶ Semertzidis, T. 2022



If we want to be sustainable, and build a Circular Economy we will have to understand SYSTEMS.

ACTION  
say, deep  
sea mining



▶ Beehner, C. 2022      ▶ Hoomans, S., Welp, M. 2022      ▶ Haas, W. 2022  
▶ Metcalf, M., Hinske, C. 2022      ▶ Sverdrup, H.U. et al. 2022



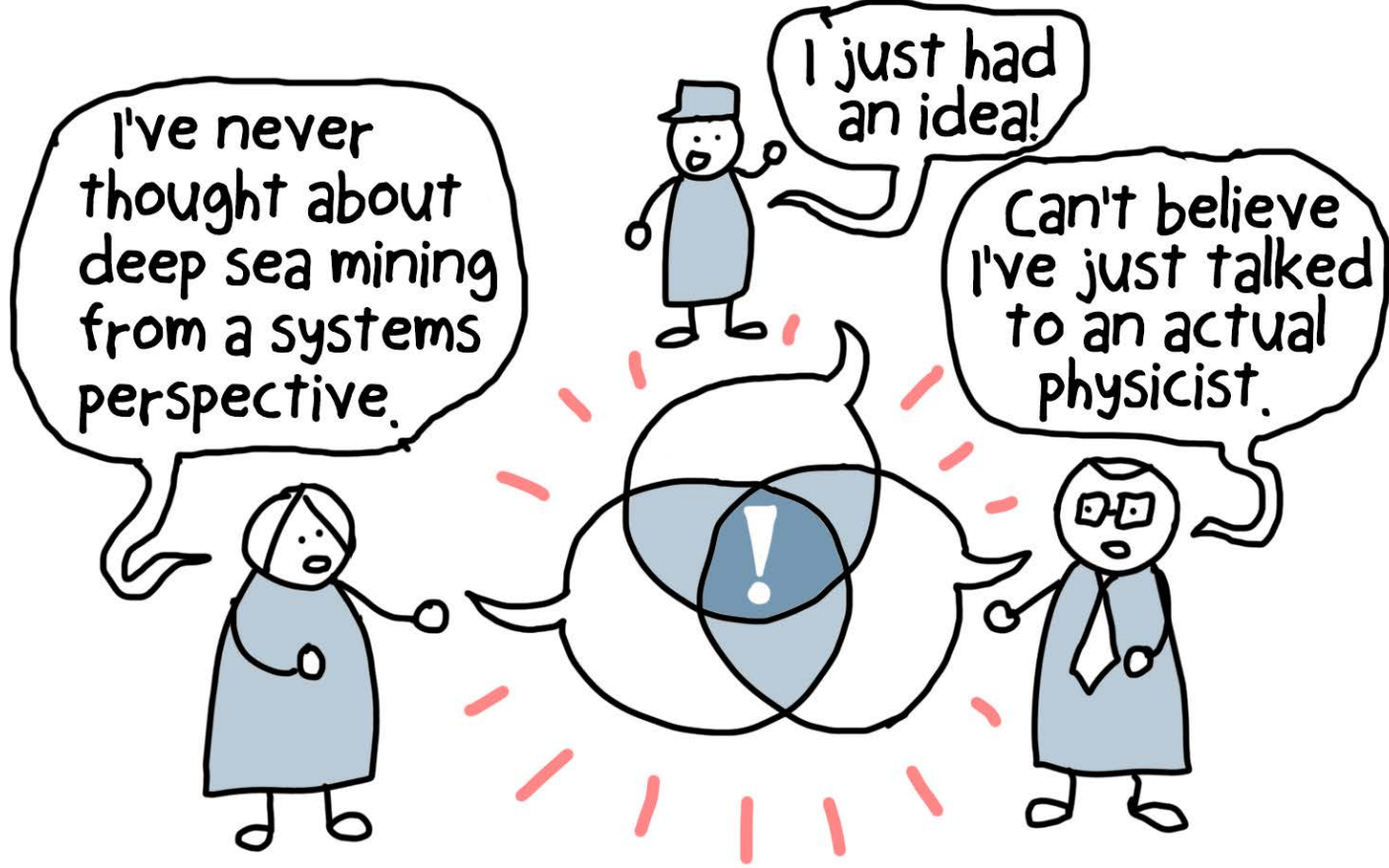


In order to make progress we need an interdisciplinary approach also within the scientific community.

I've never thought about deep sea mining from a systems perspective.

I just had an idea!

Can't believe I've just talked to an actual physicist.



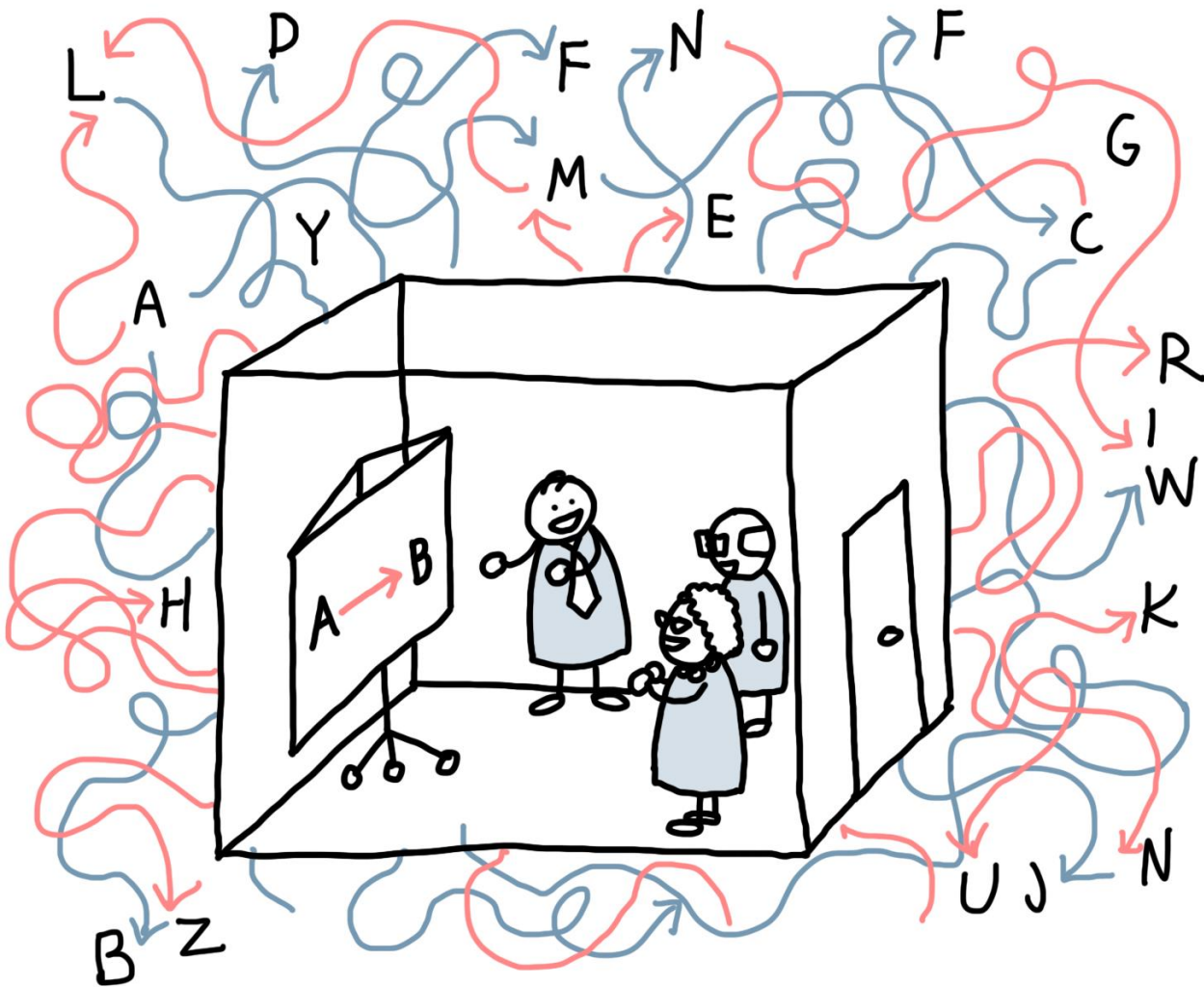
Learning to accept complexity and the unpredictability that comes with it is key. Otherwise your efforts in Circular Economy can be futile, even dangerous.

This is uncomfortable

COMPLEXITY

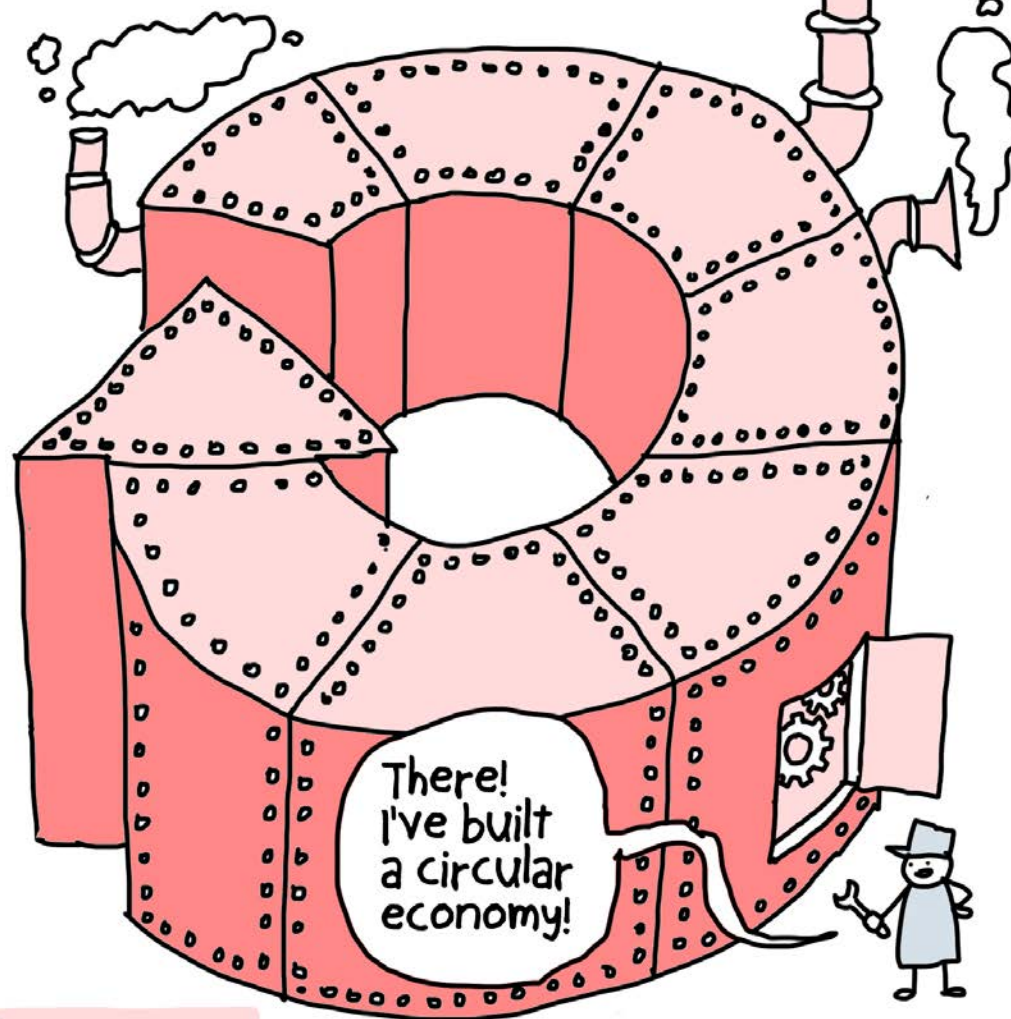


Unfortunately most organisations are still very much trapped in linear thinking.

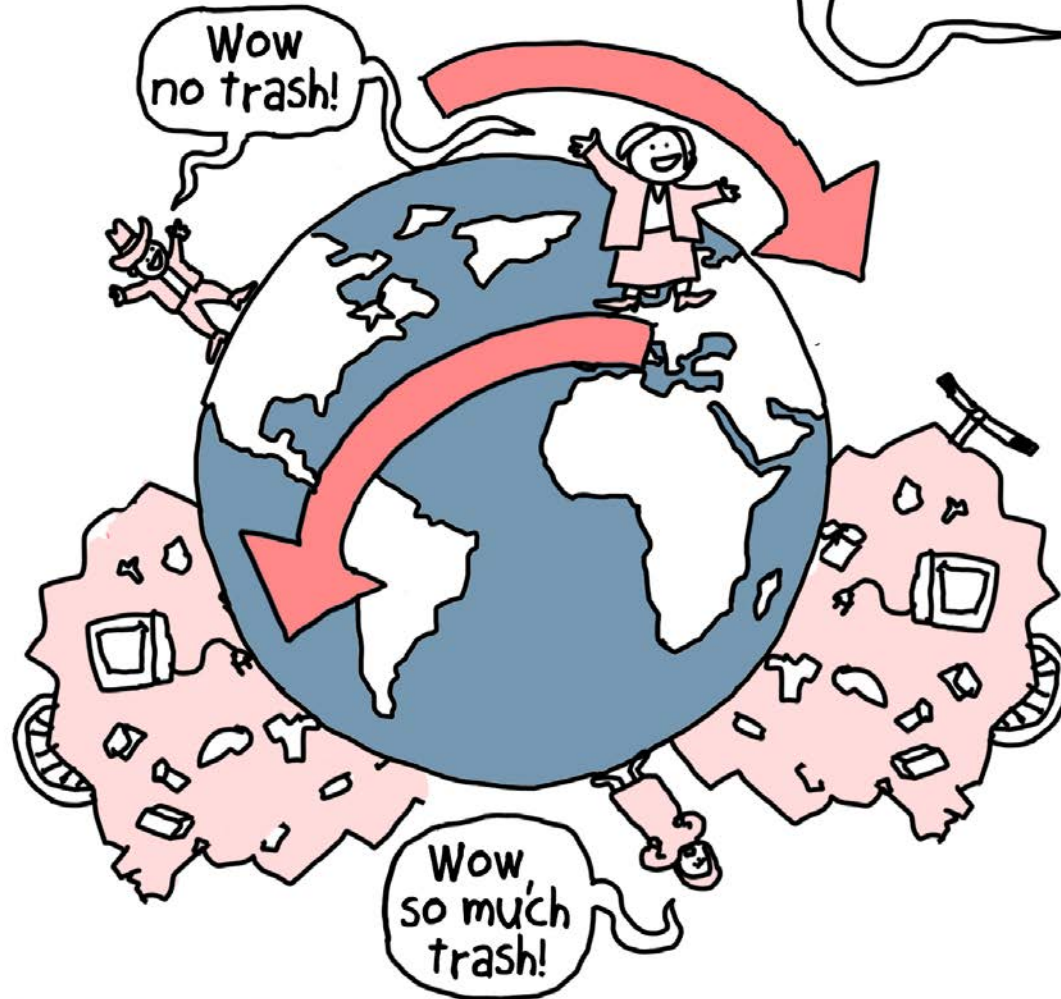




And sadly our current thinking on circularity is still based on 19th century linear models, not systems thinking!

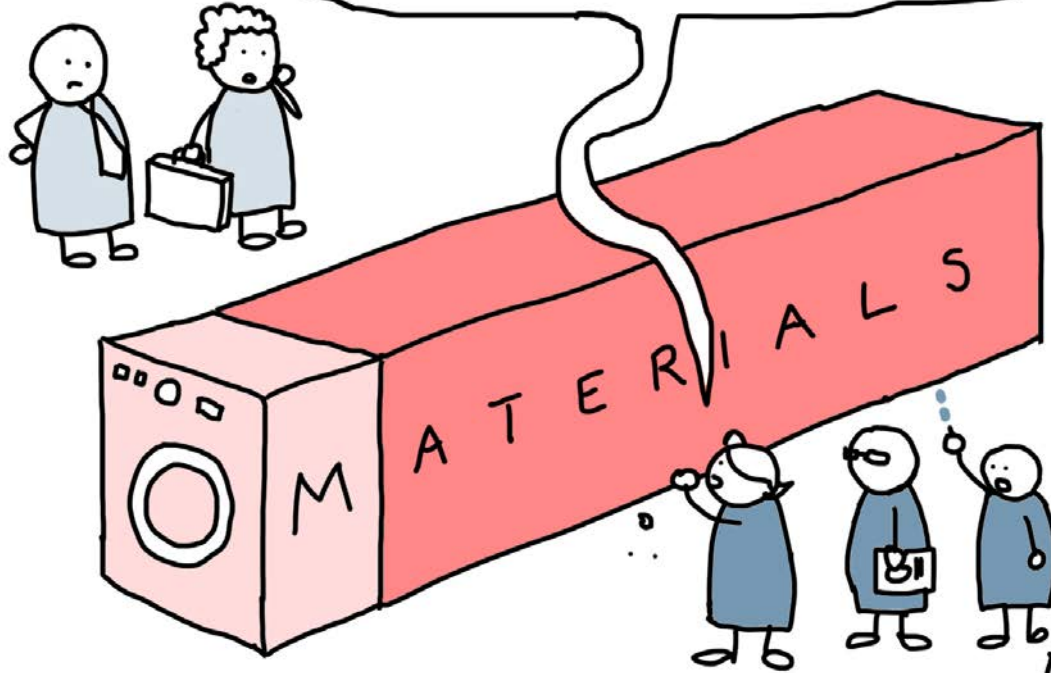


For example: If you think in terms of SYSTEMS you realise that you can't ship trash to other side of the planet and claim you've nailed recycling!





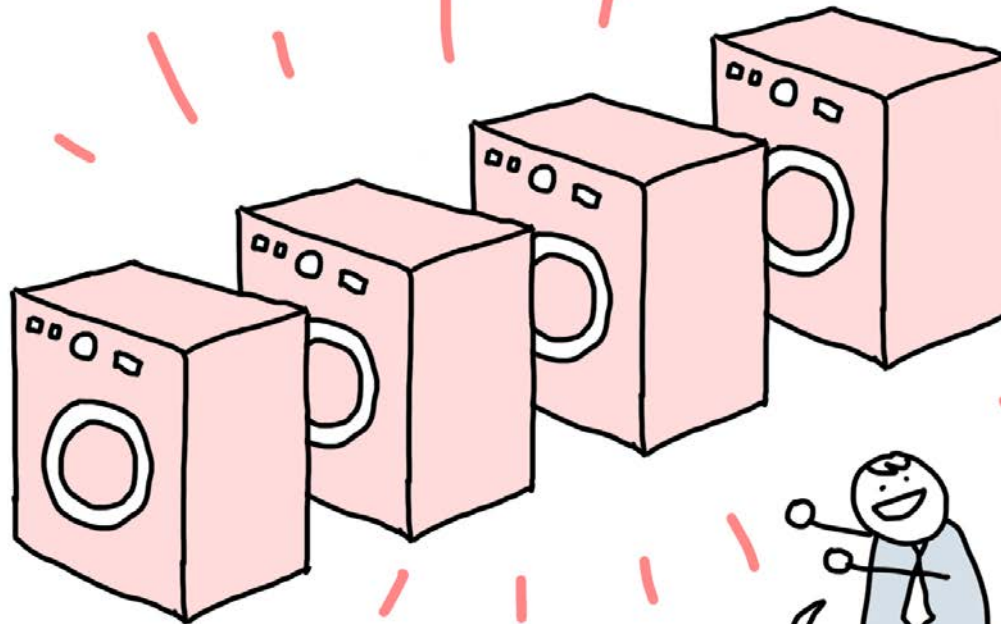
But before we even contemplate circularity, our production processes must become radically more RESOURCE EFFICIENT.



We can't keep on using this much material and water to build a single item!

▶ Lehmann, H. (2020). Sustainable Development and Resource Productivity. Routledge.

And efficiency gains must be servants to the goal of sustainability. Otherwise we get hit by rebound effects...



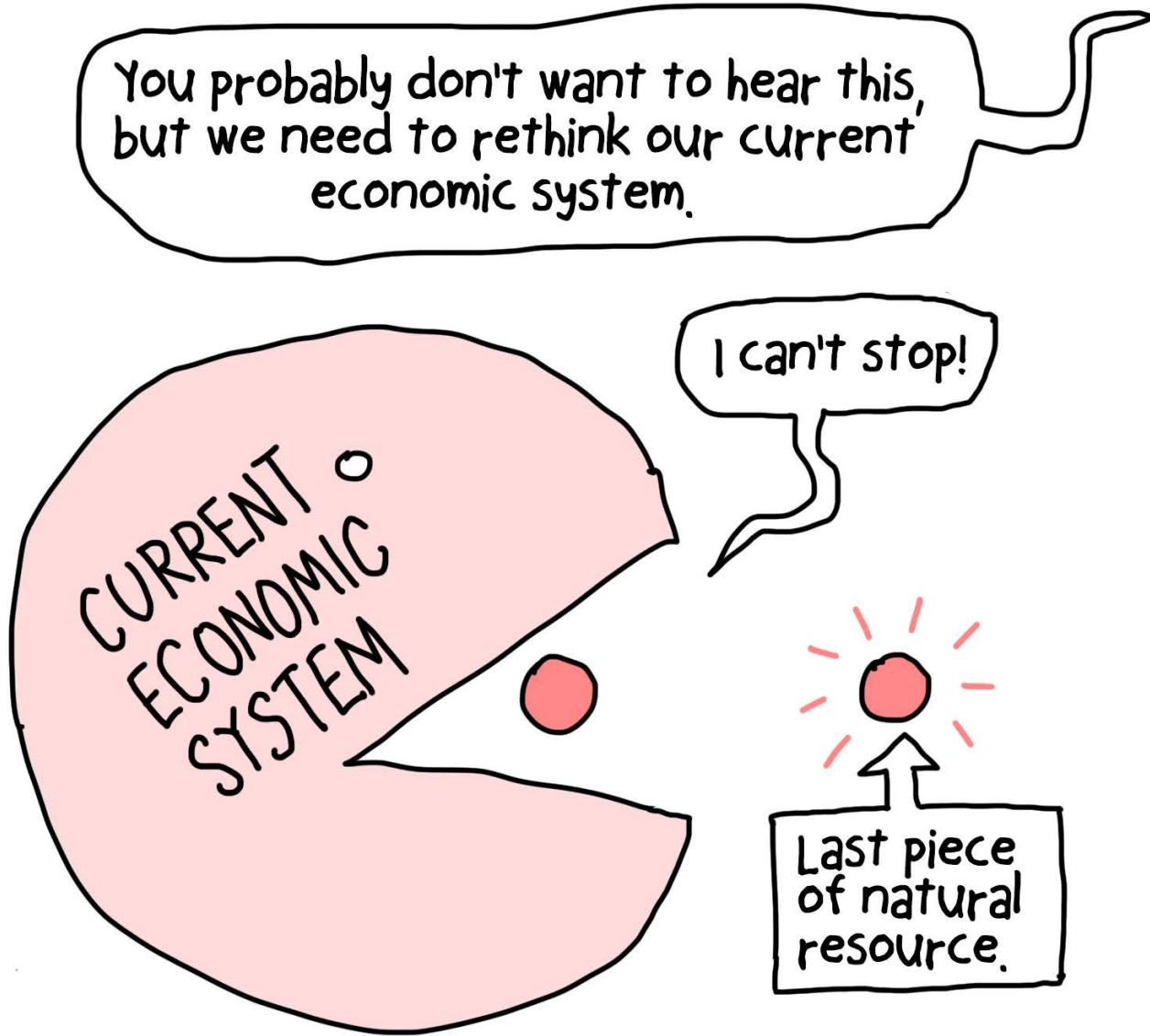
Because we're so efficient we can build four washing machines instead of one!

You probably don't want to hear this,  
but we need to rethink our current  
economic system.

I can't stop!

CURRENT  
ECONOMIC  
SYSTEM

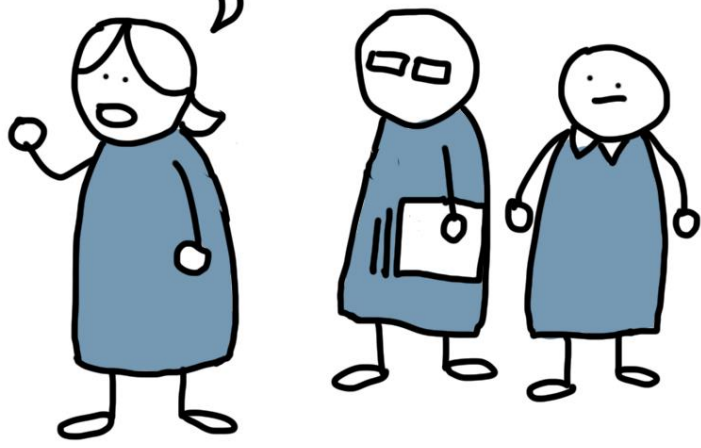
Last piece  
of natural  
resource.



Big demands.  
This will get political.

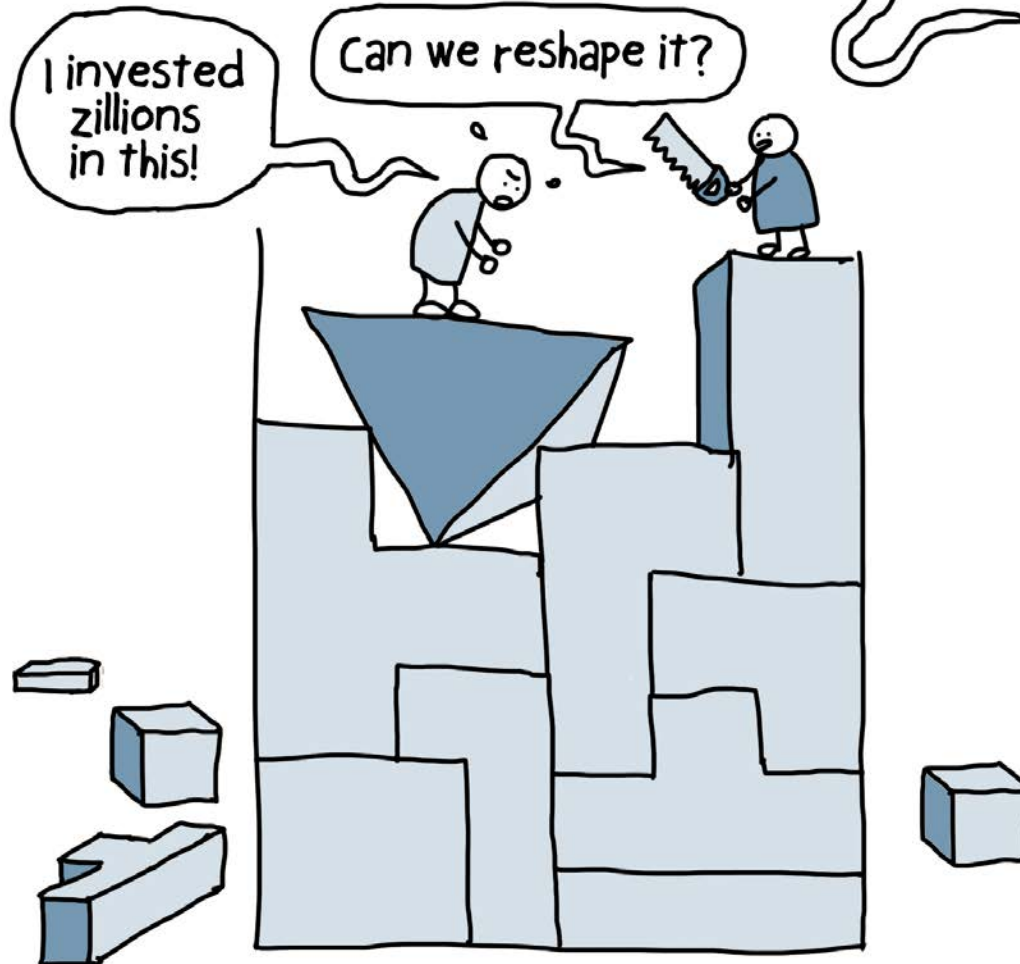


Of course it will!  
And it must!



▶ Doeland, L. 2022.  
▶ Anran, L. 2022

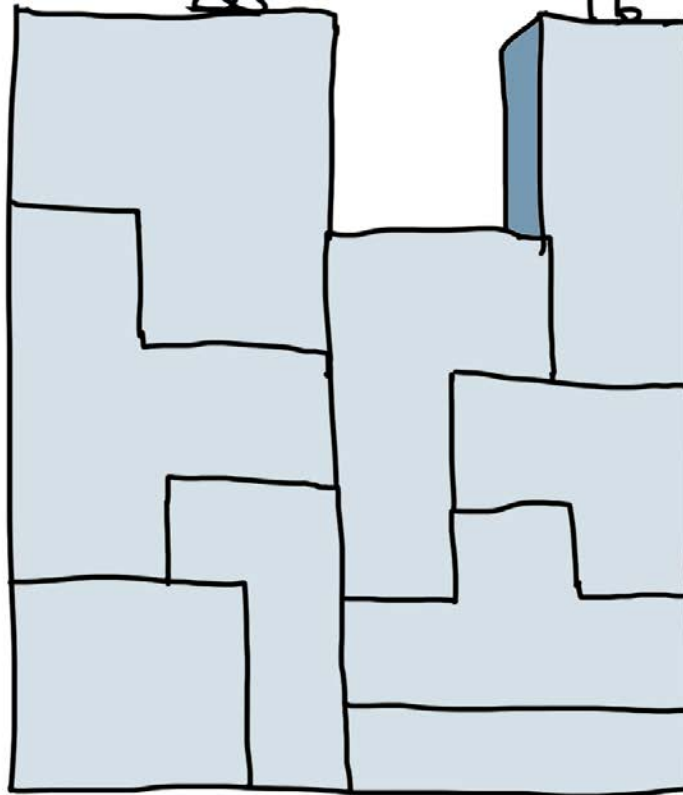
Politics is negotiation. And we must **NEGOTIATE**.  
True negotiation requires acknowledging  
**UNCOMFORTABLE FACTS**.  
Like the fact that there will be losers.



In order to cooperate across boundaries we need shared values and cultural understanding.

should we fill this gap?

What gap?





Perhaps the biggest challenge is that we can't see what's possible because we are trapped inside ONE idea of operating in the world.

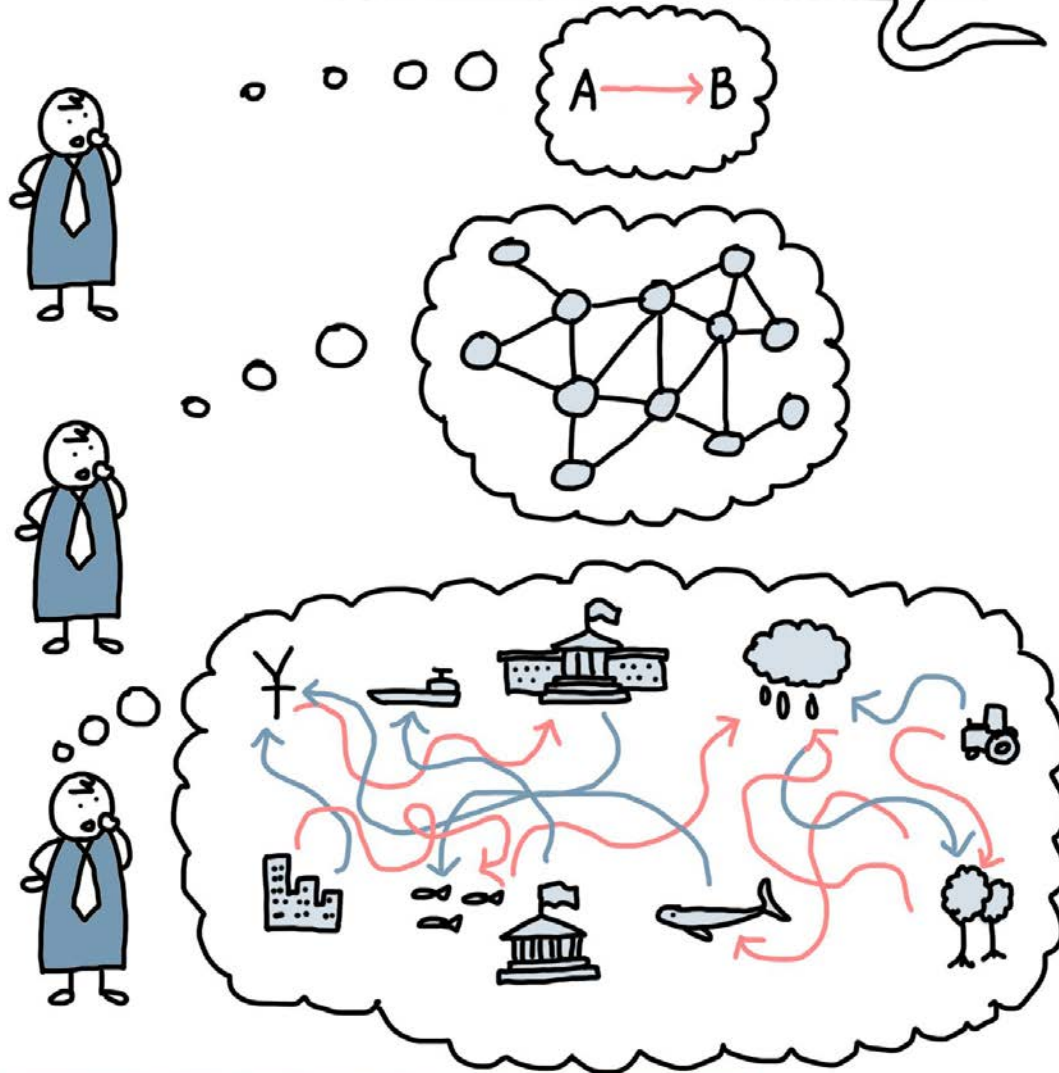
A → B

How do I reduce time to market?

▶ Dahm, D. 2022

▶ Vahle, T. et al. 2020.

We have to learn to think on multiple levels.  
Especially leaders!



▶ Beehner, C. 2022

▶ Metcalf, M., Hinske, C. 2022

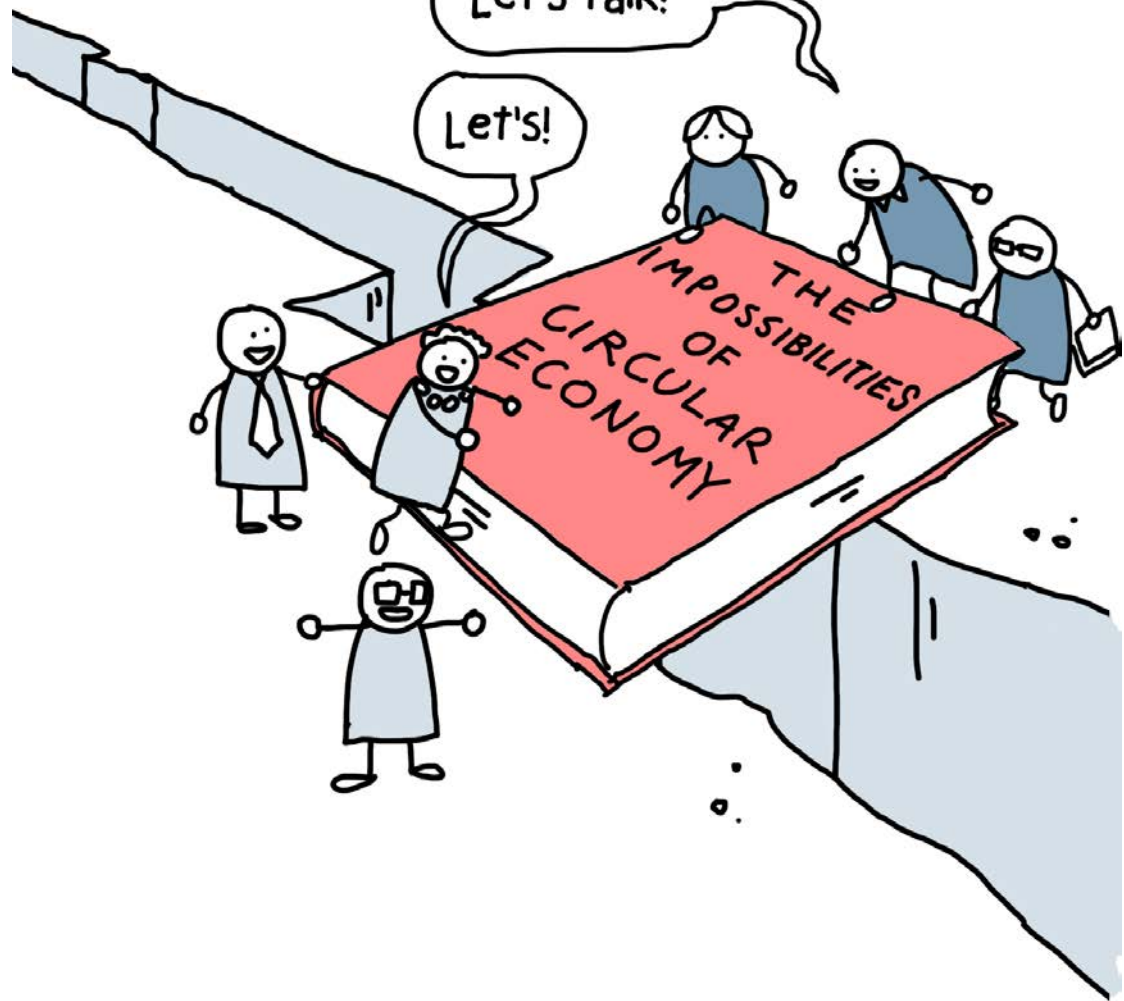
▶ Ritchie-Dunham, J. 2022.

▶ Dahm, D. 2022

If we first acknowledge the challenges,  
we can make Circular Economy  
a truly successful tool in building  
a sustainable world.

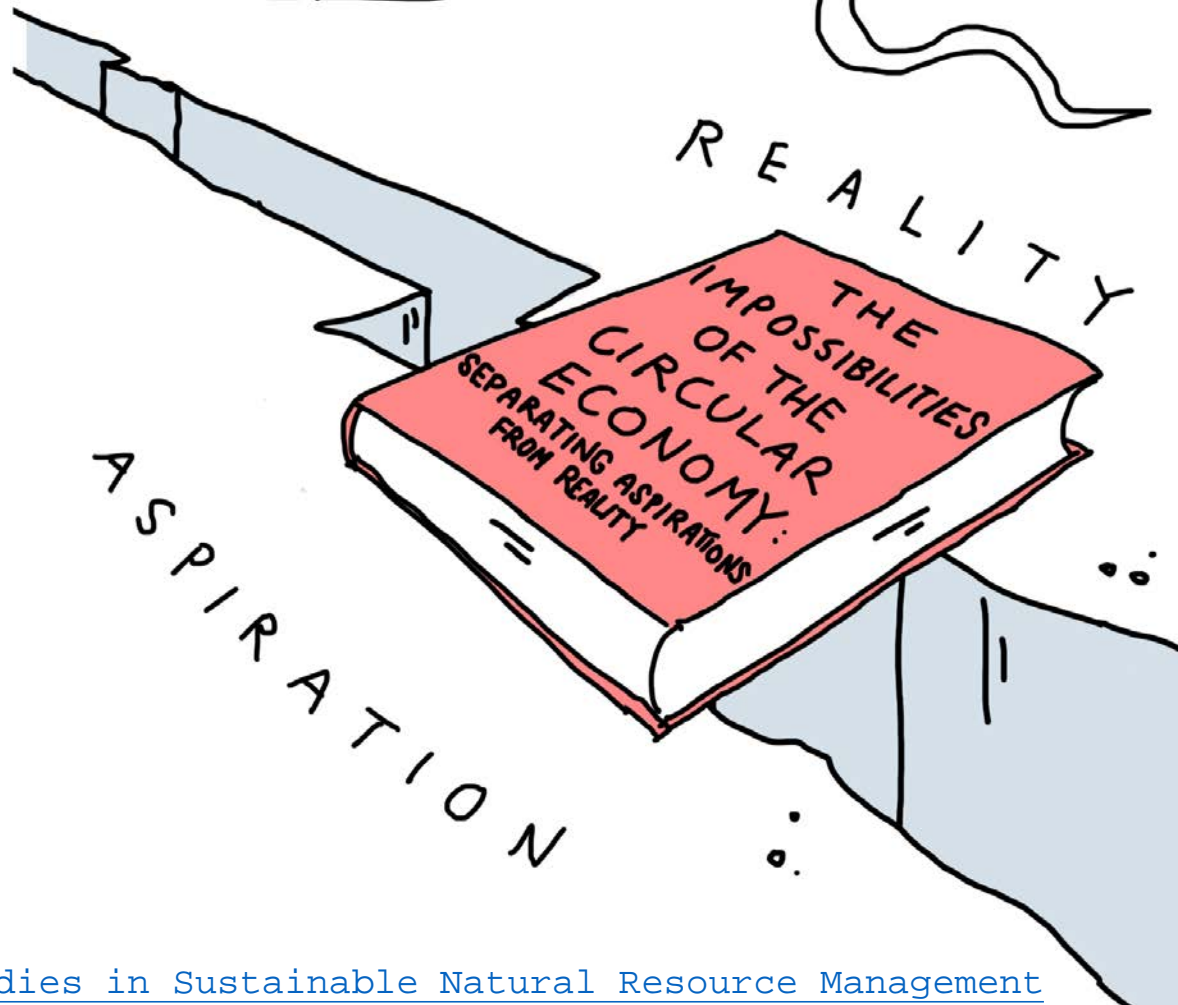
Let's talk!

Let's!



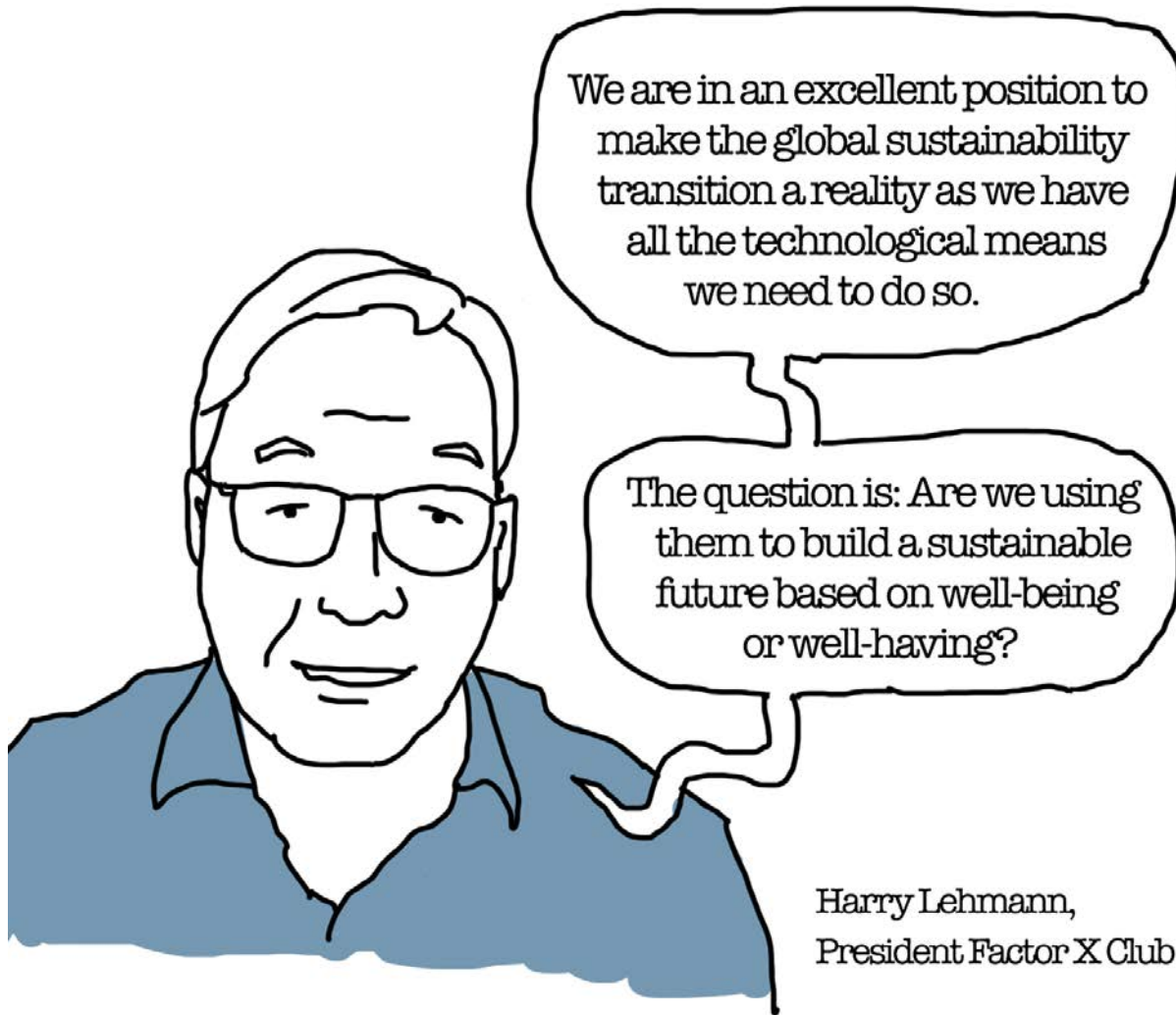
Do you want to bridge the gap between aspirations and reality?

Check out the articles in the 5th FactorX Book available open access at Routledge!




BOOK SERIES

[Factor X: Studies in Sustainable Natural Resource Management](#)



Harry Lehmann,  
President Factor X Club





This comic is funded by [www.360dialogues.com](http://www.360dialogues.com).  
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The comic does neither claim to be right nor complete.  
It's purpose is to spark interest in having deep dialogues.

CARTOON STORY BY [VIRPI@BUSINESSILLUSTRATOR.COM](mailto:virpi@businessillustrator.com)



# The Impossibilities of the Circular Economy

## Separating Aspirations from Reality - THE COMIC

Comic based on the book of the same name, published in the FactorX series at Routledge in 2022.

The present comic is published and funded by [www.360dialogues.com](http://www.360dialogues.com). It is based on the 5th Factor X publication from the Federal Environment Agency (UBA), *The Impossibilities of the Circular Economy: Separating Aspirations from Reality*.

The 5th Factor X book examines what the promise of an endless circle can and cannot deliver. Hence, it provides a solid starting point to advance circular approaches to our economies (including industrial and social processes) at a more fundamental level. Thus, it allows the reader to see through the marketing and policy charade that sells the circular economy as a silver bullet. The reader will recognise the insurmountability of specific barriers and thus be prepared not to invest their time and money in "investment dead ends".

The comic is a condensation of key ideas present in the different articles. With engaging visuals, it shows the difference between possible and non-possible solutions for a more sustainable economy.

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### We would like to thank the following actors for their support and many good ideas

The 5th Factor X book was funded by the Federal Environment Agency and the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection. The funds are made available by resolution of the German Bundestag. [Apart from this funding we, the lead editors, offer this comic illustrating the main topics of the book.](#)



[SAXION University of Applied Sciences](#) | School of Finance and International Business for providing valuable expert contributions to the lead editors in the field of Systemic Value Creation and Innovation.

**The authors of the 5th FactorX book:** They solved the impossible riddle of providing us with a sentence expressing the essence of their scientific article. Without their dedication to engaged scholarship, this comic would've not been possible:

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37. Roger Strand, University of Bergen, Norway
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39. Harald Ulrik Sverdrup, Inland Norway University of Applied Sciences
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### About the Comic

*The comic is optimised for desktop, laptop, mobile phone or tablet. The references in the comic refer to articles in the book: [The impossibilities of the Circular Economy - Separating Aspirations from Reality, published in 2022 by Routledge | Taylor&Francis](#)*

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