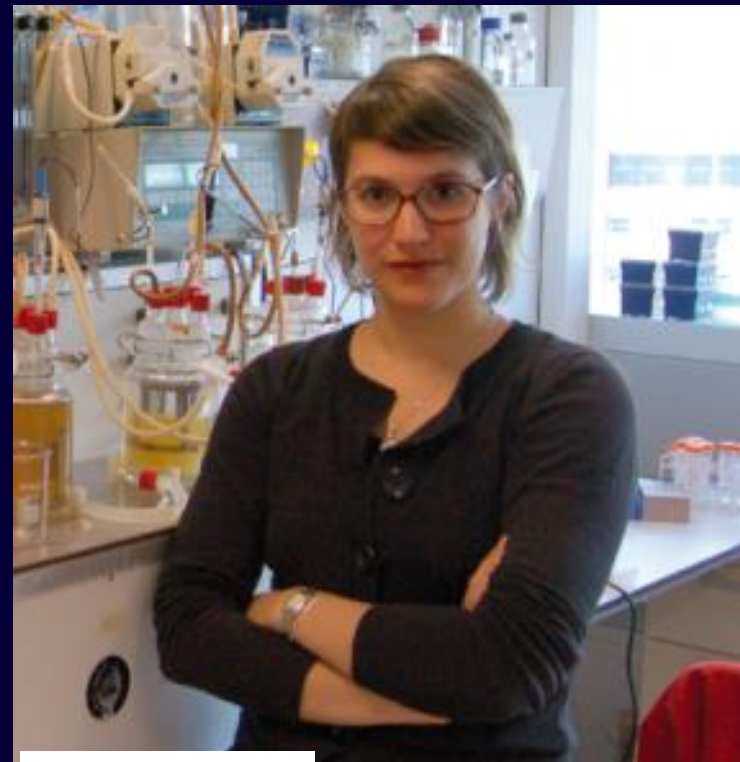


Greenwashing or true transition? Public (dis)trust in the chemical industry.

Rosanne Hertzberger

My background



Encounters with oxygen Aerobic physiology and H₂O₂ production of *Lactobacillus johnsonii*



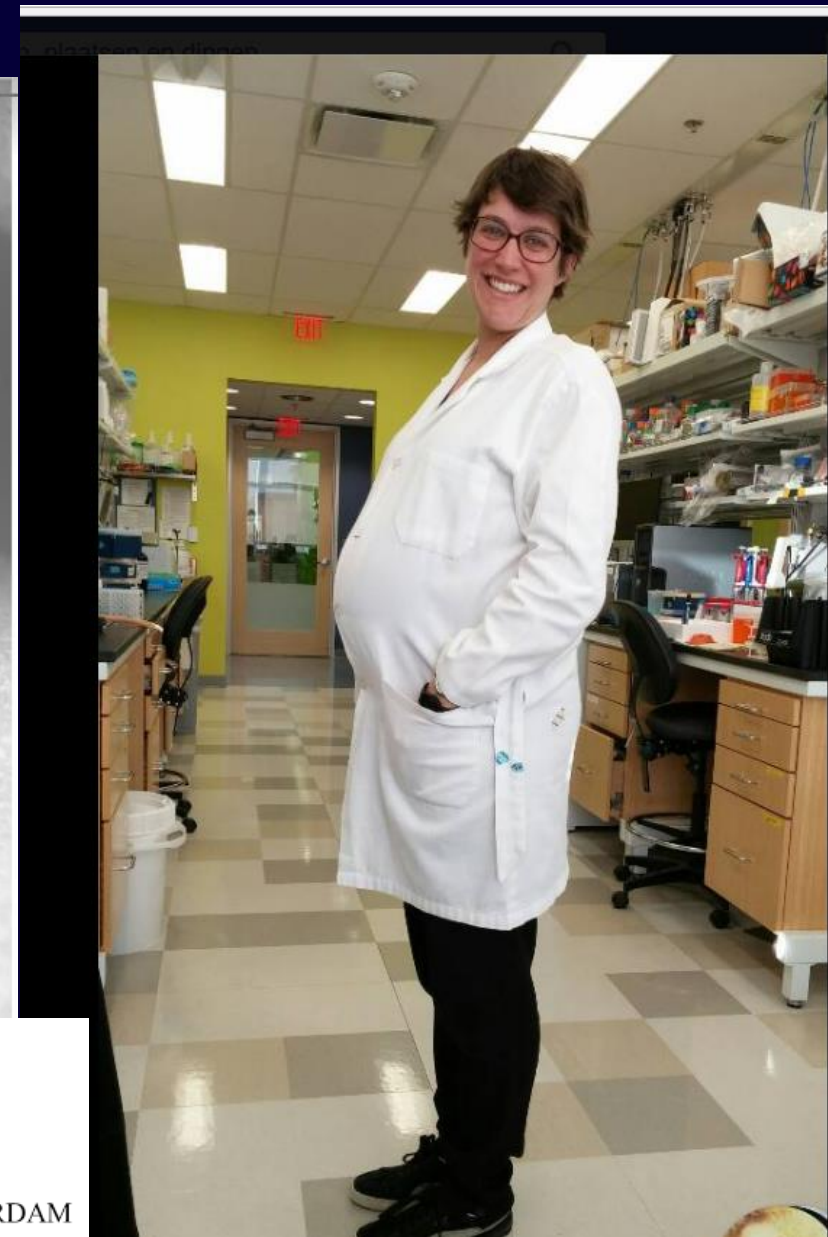
Encounters with oxygen

Aerobic physiology and
H₂O₂ production of
Lactobacillus johnsonii

Rosanne Y. Hertzberg



UNIVERSITEIT VAN AMSTERDAM



Researcher at the Systems Biology Lab VU Amsterdam



- *Lactobacillus* –rich human vaginal microbiome.
- Low diversity, low pH. Unique for humans.
- One lactic acid bacterium (*Lactobacillus crispatus*) strongly associated with good health outcomes
 - Urogenital infections (STD's incl HIV, UTI's, HPV, HSV)
 - Fertility
 - Miscarriage / pregnancy loss / preterm birth
- Own research: bacterial carbohydrate metabolism.



crispatus.org

Oxford
British parliamentary debating tournament



Menu

nrc

Mijn nieuws



Rosanne Hertzberger

14 augustus 2021

Leestijd 2 minuten

Opslaan in leeslijst



Telkens op zoek naar Covid-zondebokken

Er klonk een kil bliepje in de lege hal van het Musée des Beaux Arts in Quimper, Bretagne. De scanner in de hand van de meneer had zojuist aangegeven dat ik niet ‘zuiver’ genoeg was voor de expositie van impressionist Henry Moret. Ik weet niet welke



VPRO Zomergasten in 5 minuten: Rosanne Hertzberger

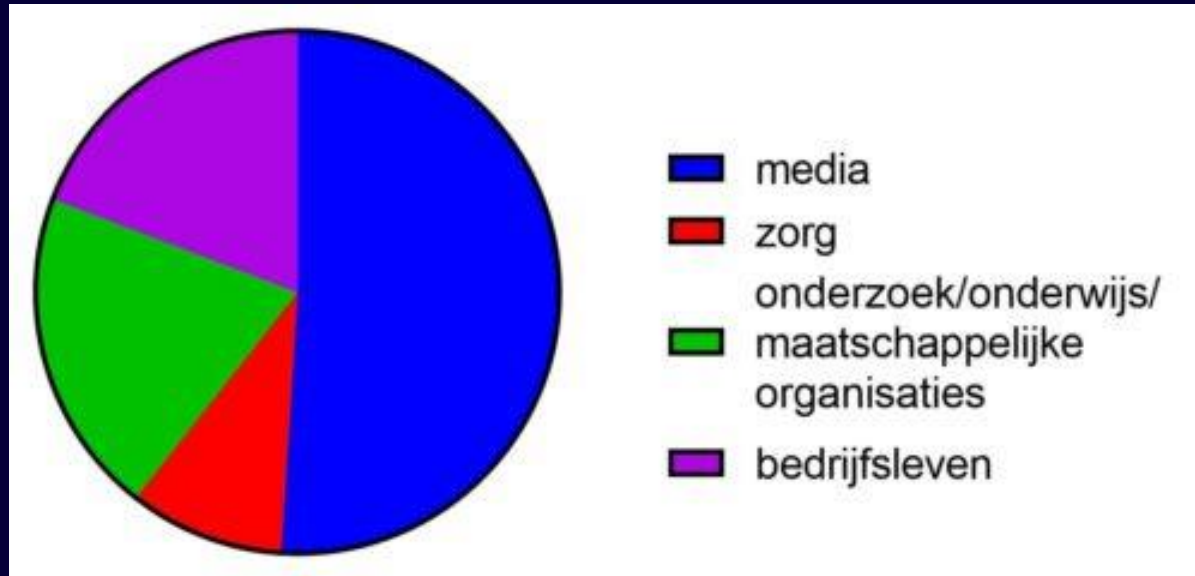


0:04 / 5:59

Scroll for details



Conflict of interest (many)



Professional sideliner (I know my place)

- AVRO-Tros (media)
- Category&Trade (bedrijfsleven)
- CITO (onderwijs)
- DICA (zorg)
- Hogeschool Utrecht (onderzoek/onderwijs)
- Hyphen projects (bedrijfsleven)
- KAMG (zorg)
- Katholiek Vrouwendispuut (maatschappelijke organisaties)
- KNVM/NVMM (onderzoek/onderwijs)
- Nederlands Instituut voor de Publieke Veiligheid (onderzoek)
- Nederlands Orthopedie Vereniging (zorg)
- Nederlandse Vereniging Farmacologische Geneeskunde (bedrijfsleven)
- Plusmarkt (bedrijfsleven)
- TOPX vrouwen netwerk (bedrijfsleven)
- UMC Utrecht (onderzoek/onderwijs)
- Universiteit Utrecht (onderzoek/onderwijs)
- Vereniging Farma & Recht (bedrijfsleven)
- VNFKD (bedrijfsleven)
- Wageningen Universiteit (onderzoek/onderwijs)

+omroepen, podcasts en NRC

Europa's geopolitieke vakantie is voorbij



De Europese Unie kan onze gezamenlijke veiligheid borgen. Dan moet er wel wat gebeuren.

& VERDER

3

Abortus
Het recht op abortus wordt bedreigd. *Rebecca Gomperts* waarschuwt.

7

Rusland
Nu moet het Westen strijden om de harten en geesten van de Russen

9

Migratie
Afrikanen vluchten niet voor het klimaat, maar voor het wanbeleid

1/2



& VERDER

2/3

Landbouw
Meer palmolie en minder ontbossing? Zet eens een koe tussen de bomen

9

Karel Knip
Waar liggen de wortels van de huzaren-salade?

10/11

Alfabet
Bijna had China het karakterschrift afgeschaft

勝

De ravage van corona

30.000 mensen met een nog redelijke levensverwachting stierven aan Covid-19. Komt er nog een vreselijke nasleep?

1/2

Science and opinion: two neatly separated worlds.

Europa's geopolitieke vakantie is voorbij



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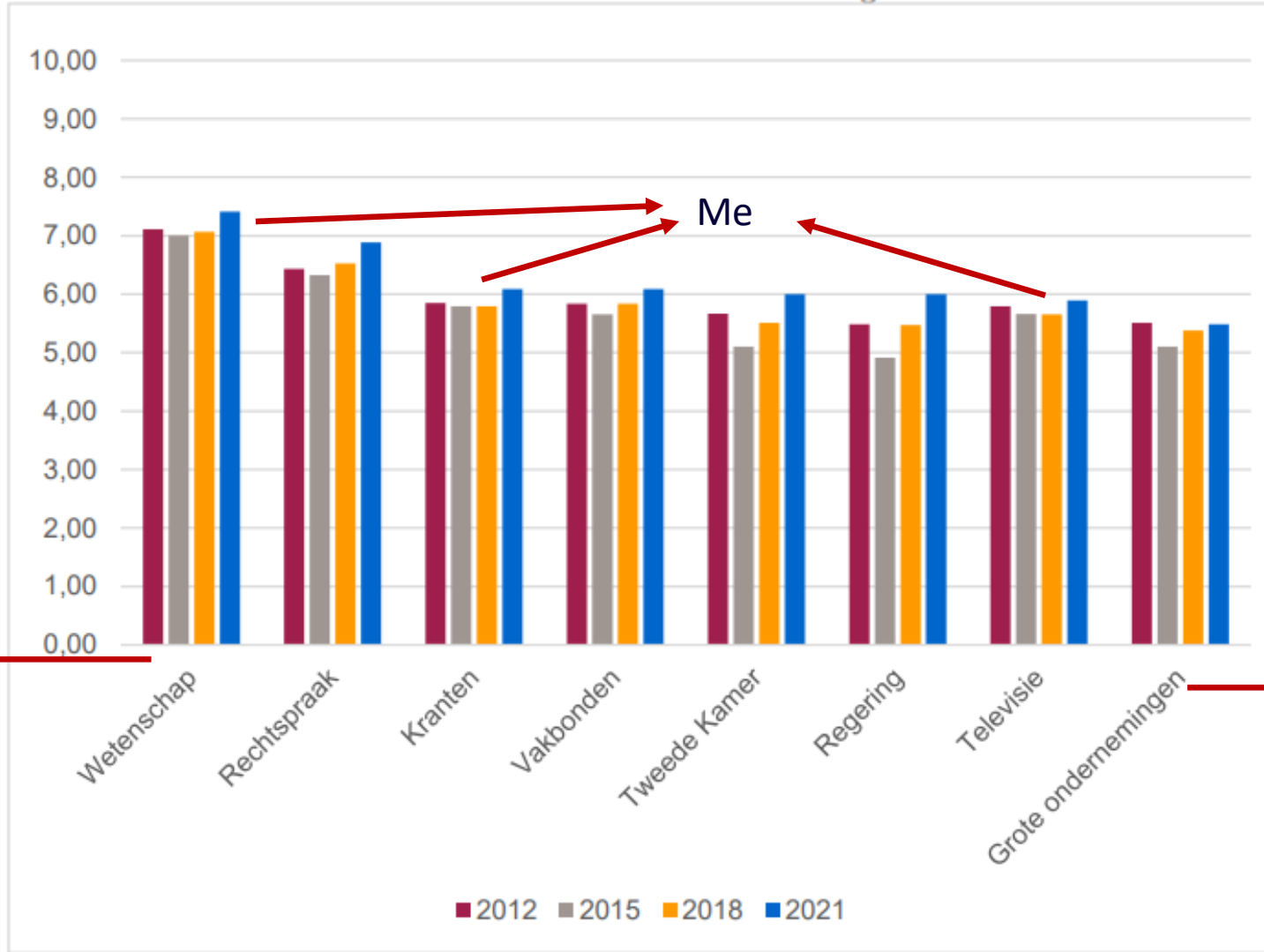
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1/2

Science and opinion: two neatly separated worlds.
In reality strongly intertwined

Science: high trust, high expectations. Industry: Low trust, low expectations.

Grafiek 1. Gemiddeld vertrouwen van Nederlandse burgers in instituties.



Public-private partnerships:
marriage between organisations
with high and low levels of trust.

Worked surprisingly well.
Many similarities: slow, lethargic,
bureaucratic, with enthusiastic
innovative visionary professionals.

Who studied together.

WUR

Industry

Life Science & Technology



Student in Leiden/Delft (2002-2008)

Ready to change the world with fermentation/enzymes/biomass.

- The future is fermented: low temperature, water as a solvent, biopowered
- *Saccharomyces cerevisiae* xylose (C5) fermentation
- Biobased products derived from biomethanol?
- Shell Gourami business challenge (2007): the future of biomethanol?
- Public-private partnerships: strongly intertwined with industry.
- Later at UvA (PhD), neighbours using cyanobacteria for chemical building block production.

Quote from a design project
*Additionally, we exclude the **gasification of biomass and Fischer-Tropsch technology.***

*This option, although tempting as a straightforward replacement of petrochemical syngas, was rejected. **Gasification is considered too energy intensive and cannot be included in a green marketing scheme.***

It's 2023: what happened to our biobased dreams?

Some impressive bioplastics companies.

Bioplasticdroom Avantium staat voor grote test



Het Belgisch-Nederlandse Avantium wil plantaardig plastic op commerciële schaal produceren. ©Avantium



Paques Biomaterials maakt echt afbreekbaar bioplastic uit afvalwater

Bacteriën in afvalwater die op natuurlijke wijze bioplastic maken, dat na gebruik weer helemaal afgebroken wordt in de natuur door diezelfde bacteriën. Het Friese Paques Biomaterials wil er de markt voor alternatieven voor fossiel plastic mee veroveren.

Still after 30 years of investments, research, meetings like this, share of bioplastics is at 1-2%. Bioplastics are still a niche.

Meanwhile, industry sounded like the great transition was always around the corner.

Industrial storytelling – Or how to sell fossil fueled business in times of climate change



Looking green,
nodding,
cheering,

Meanwhile not change a thing.

New climate action: extensive fines from
consumer authorities for greenwashing

Diesel has really cleaned up its act.

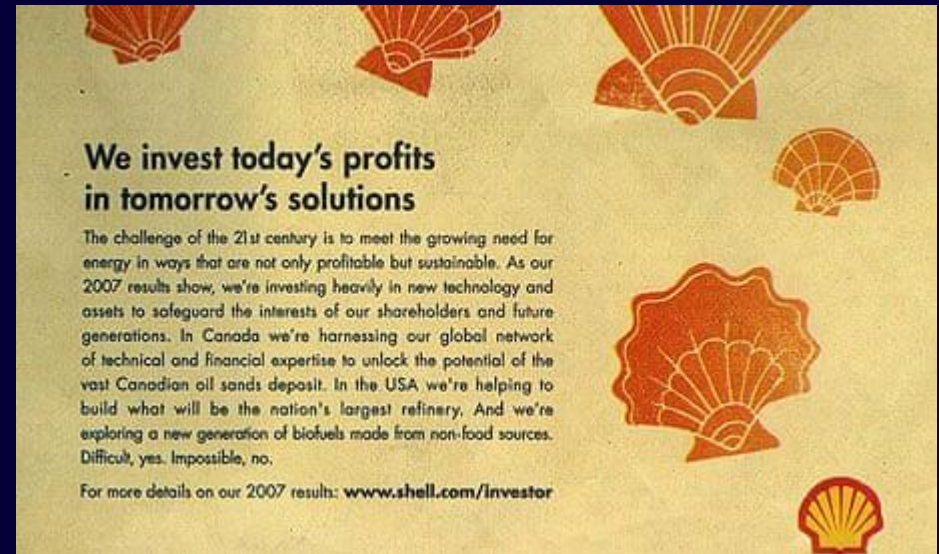
Find out how clean diesel technology impacts fuel efficiency and performance, while also being a more eco-conscious choice.



We invest today's profits in tomorrow's solutions

The challenge of the 21st century is to meet the growing need for energy in ways that are not only profitable but sustainable. As our 2007 results show, we're investing heavily in new technology and assets to safeguard the interests of our shareholders and future generations. In Canada we're harnessing our global network of technical and financial expertise to unlock the potential of the vast Canadian oil sands deposit. In the USA we're helping to build what will be the nation's largest refinery. And we're exploring a new generation of biofuels made from non-food sources. Difficult, yes. Impossible, no.

For more details on our 2007 results: www.shell.com/investor



Set ambitious targets, that will not be met.

Australia recycles just 18% of plastic packaging and will not reach 2025 target, review finds

Environmental campaigners say industry-led approach is failing and stronger laws are needed


- [Follow our Australia news live blog for the latest updates](#)
- [Get our morning and afternoon news emails, free app or daily news podcast](#)



Guardian

Achtergrond • 16 juni '22 08:00

Moeizaam duurzaam: de lange weg van 'schattig' naar 'schaalbaar'

 Renol Vestergaard

Er zijn talloze bedrijven die producten van organisch afval maken. Meestal blijven het bescheiden ondernemingen met een beperkte impact op milieu en samenleving. Hoe worden ze volwassen? Over Brabantse creativiteit, spieken bij de natuur en zuinige afnemers. 'Is één extra cent per duurzame Mars-wikkel echt te veel?'

FD: bioplastics from cute to scalable...
'is 1 extra cent for a Mars bar wrapper asking too much?
The answer is YES!

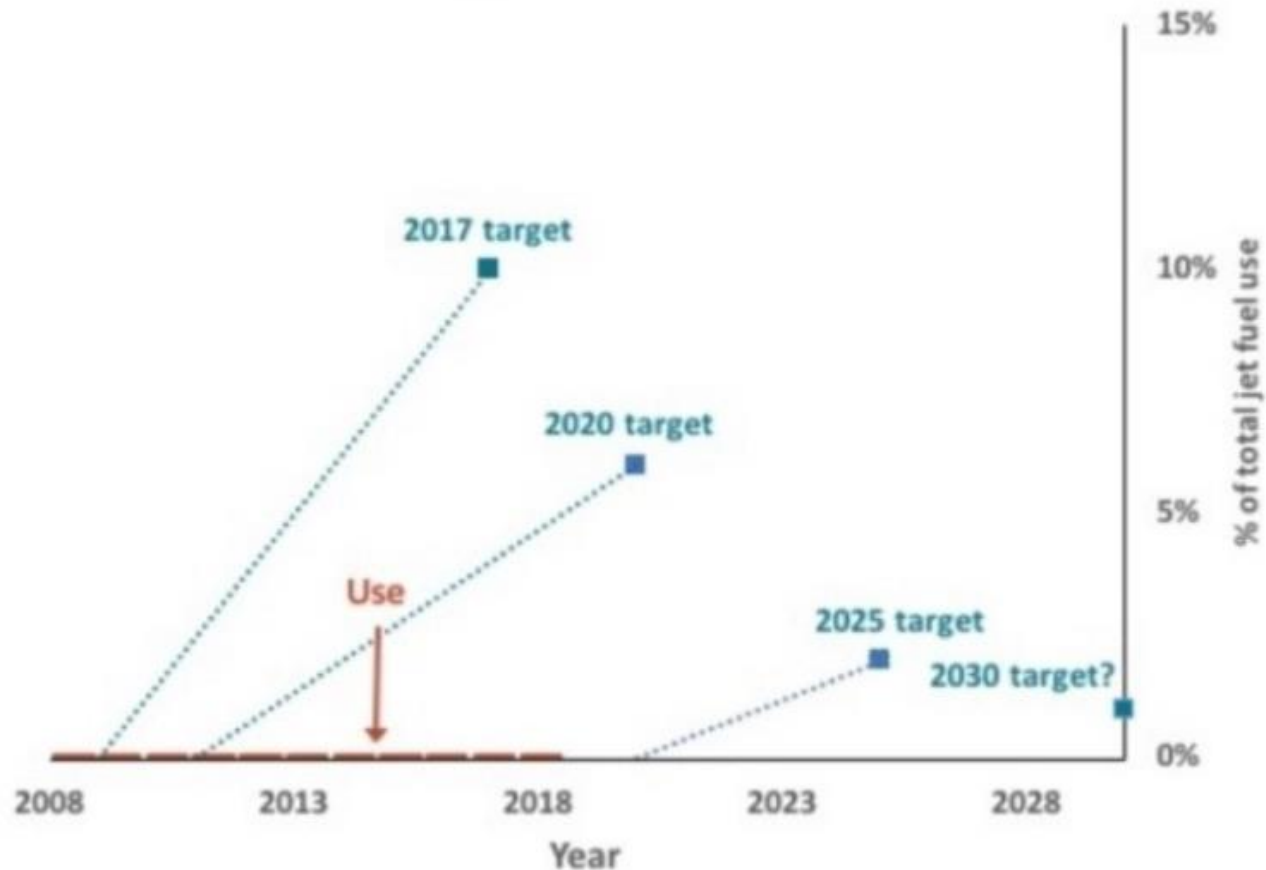
There is nothing that bioplastics can't do: Today, there is a bioplastic alternative for almost every conventional plastic material and corresponding application.

European Bioplastics



Reuters.

IATA alternative fuel goals vs. actual use, 2008 to 2030



Lots of fingerpointing:
there are no buyers,
there are no suppliers,
there is no market,
the consumer doesn't care.
The regulators don't regulate.
Nobody is willing to pay
We did not get enough subsidy.

(always the other)

Investing in small steps, intermediate steps, unsustainable steps



Carbon Capture Investment Hits Record High of \$6.4 Billion

TATA STEEL



HISARNA

Building a sustainable steel industry

Care for the environment is one of Tata Steel's core values. Tata Steel is committed to contributing to the creation of a sustainable society through product and process innovations.

CO2 emissions from biomass burning on the rise

02/12/2021 15:00



- Still burning hydrocarbons
- Wiping emissions under the carpet.
- Ambitions for carbon neutrality in 2050 but no credible path.

Does biomass have a credible path? Where are the C's coming from?

December 2022: Biodiesel from frying oils.



Chris Buijtenhek van inzamelbedrijf Willy's Vet levert tonnen af bij oliebolleakraam Zelfgebakken in Mijdrecht om frituurvet te kunnen recyclen. Beeld Raymond Rutting / de Volkskrant

Volkskrant

USA: still corn as far as the eye can see.
For feedlots and bio-ethanol.

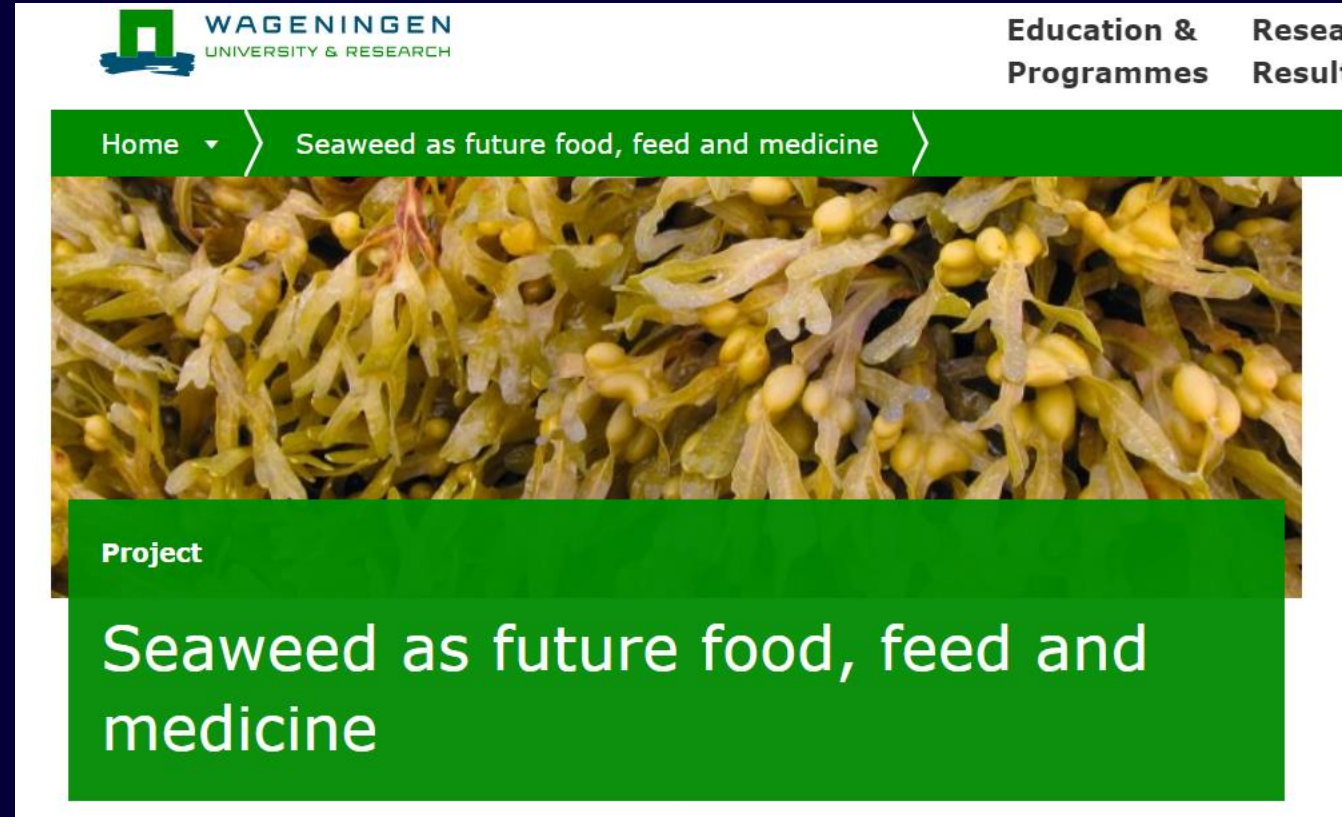


How many PJ of biomass (and land/water/fertilizer etc) can we responsibly dedicate for chemistry?

Real sustainable C's are always 'the future'

Can high-tech photosynthesis turn CO₂ into fuel for your car?

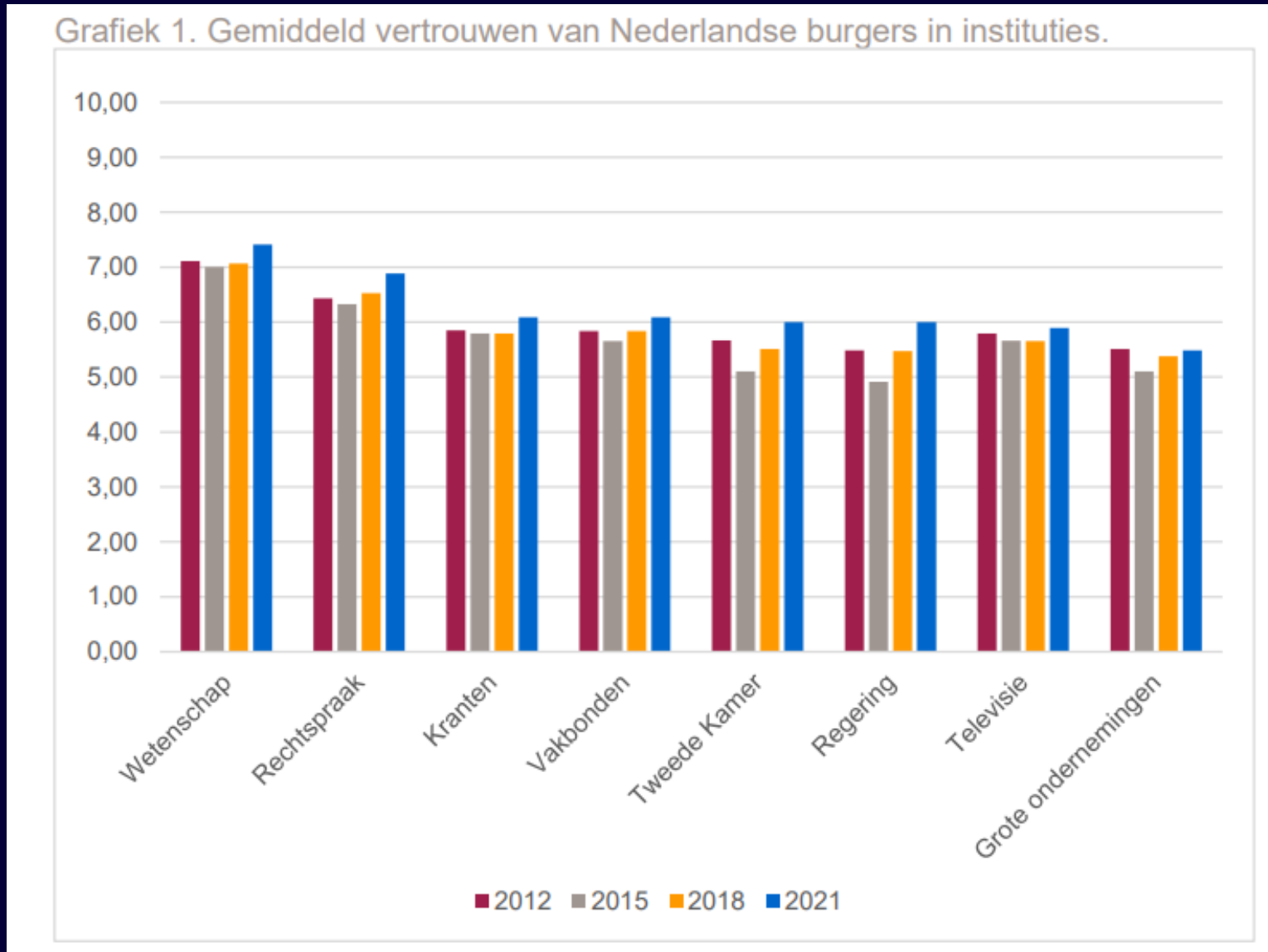
Researchers around the world are developing artificial photosynthesis to turn carbon dioxide and sunlight into liquid fuel



The screenshot shows the Wageningen University & Research website. The header includes the university logo and name, and navigation links for 'Education & Programmes' and 'Research Results'. A green navigation bar contains 'Home' and 'Seaweed as future food, feed and medicine'. Below this is a large image of seaweed. A green overlay at the bottom of the image contains the text 'Project Seaweed as future food, feed and medicine'.

Why is it 2023 and are these technology still in infancy?
Will they ever grow up?

Science: high trust, high expectations. Industry: Low trust, low expectations.



We have more trust in science. Is that justified?

Also in universities we do a great deal of greenwashing and storytelling.

Academic storytelling (and longer)

ELSEVIER journal homepage: www.elsevier.com/locate/meteng

Crabtree/Warburg-like aerobic xylose fermentation by engineered *Saccharomyces cerevisiae*

Sae-Byuk Lee^{a,b,c,d}, Mary Tremaine^a, Michael Place^{a,c,d}, Lisa Liu^a, Austin Pier^a, David J. Krause^{a,b,c,d}, Dan Xie^a, Yaoping Zhang^a, Robert Landick^{a,e,f}, Audrey P. Gasch^{a,c,d}, Chris Todd Hittinger^{a,b,c,d,*}, Trey K. Sato^{a,*}

^a DOE Great Lakes Bioenergy Research Center, University of Wisconsin-Madison, WI, USA
^b Wisconsin Energy Institute, J. F. Crow Institute for the Study of Evolution, University of Wisconsin-Madison, Madison, WI, USA
^c Laboratory of Genetics, University of Wisconsin-Madison, Madison, WI, USA
^d Center for Genomic Science Innovation, University of Wisconsin-Madison, Madison, WI, USA
^e Department of Biochemistry, University of Wisconsin-Madison, Madison, WI, USA
^f Department of Bacteriology, University of Wisconsin-Madison, Madison, WI, USA

How to sell obscure fundamental research:

THIS WILL CURE CANCER

THIS WILL STOP CLIMATE CHANGE

THIS WILL SOMEDAY BE USEFUL AS A
biomarkers / antibiotic target / vaccine

GIVE ME MONEY!



CRISPR-Cas

DE TOEKOMST VAN DE NEDERLANDSE ENERGIE- INTENSIEVE INDUSTRIE

EINDBEELDEN EN STRATEGIEËN VOOR DE
NEDERLANDSE ENERGIE-INTENSIEVE INDUSTRIE IN
EEN KLIMAATNEUTRALE SAMENLEVING
VOOR 2030 TOT 2050

HET VERHAAL



QUINTEL
INTELLIGENCE

Does biotechnology even play a meaningful role in the energy / feedstock transition?

‘The future of the energy-intensive industry’ - Quintel 2017
Missing in action: biobased / fermentation.

Plastics future:

Eth(yl)ene → from CO + CO₂ from waste gas steel and fertilizer industry

or

Electric steam cracking furnaces C from waste streams ?!

SHELL AND DOW START UP E-CRACKING FURNACE EXPERIMENTAL UNIT

16 Jun 2022

Milestone demonstrates significant step toward decarbonising a critical petrochemical manufacturing process.

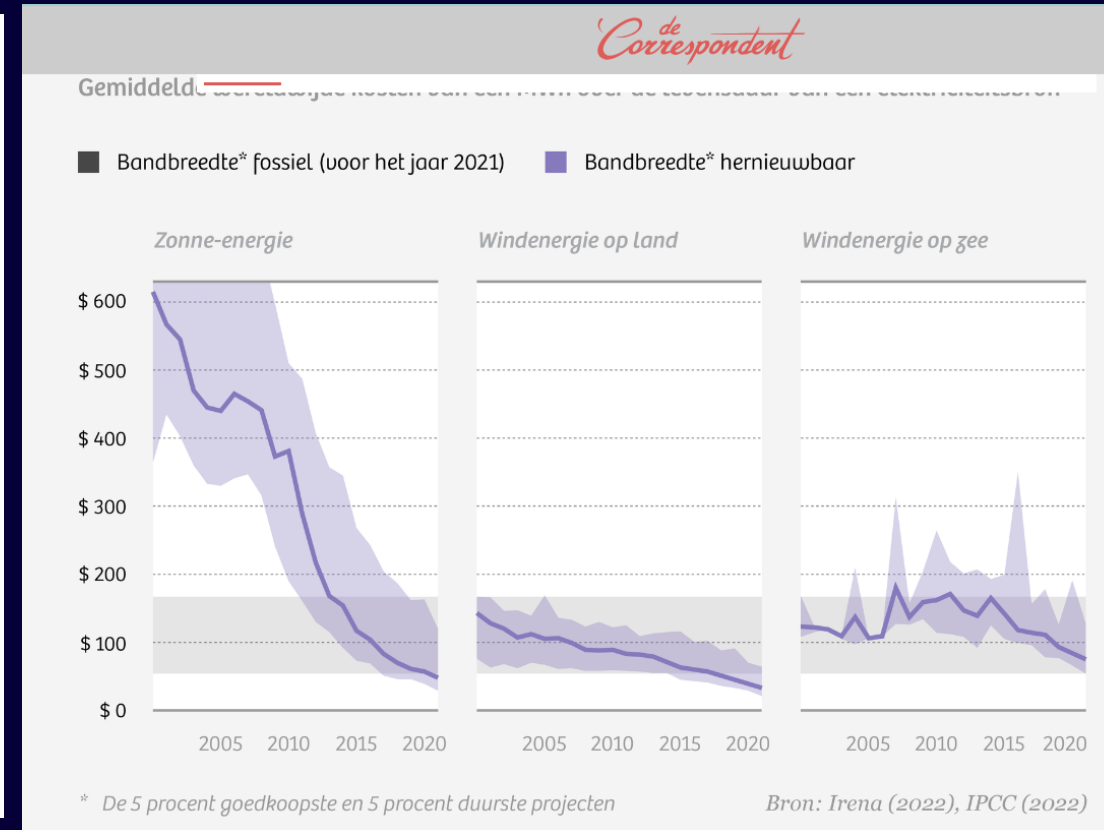
Fermentation mostly for **boutique chemistry, niches** and green **marketing purposes**.

Chemistry has beaten biochemistry. Tell me why I am wrong.

We were beaten by a combination of:

Dirt cheap solar/wind energy

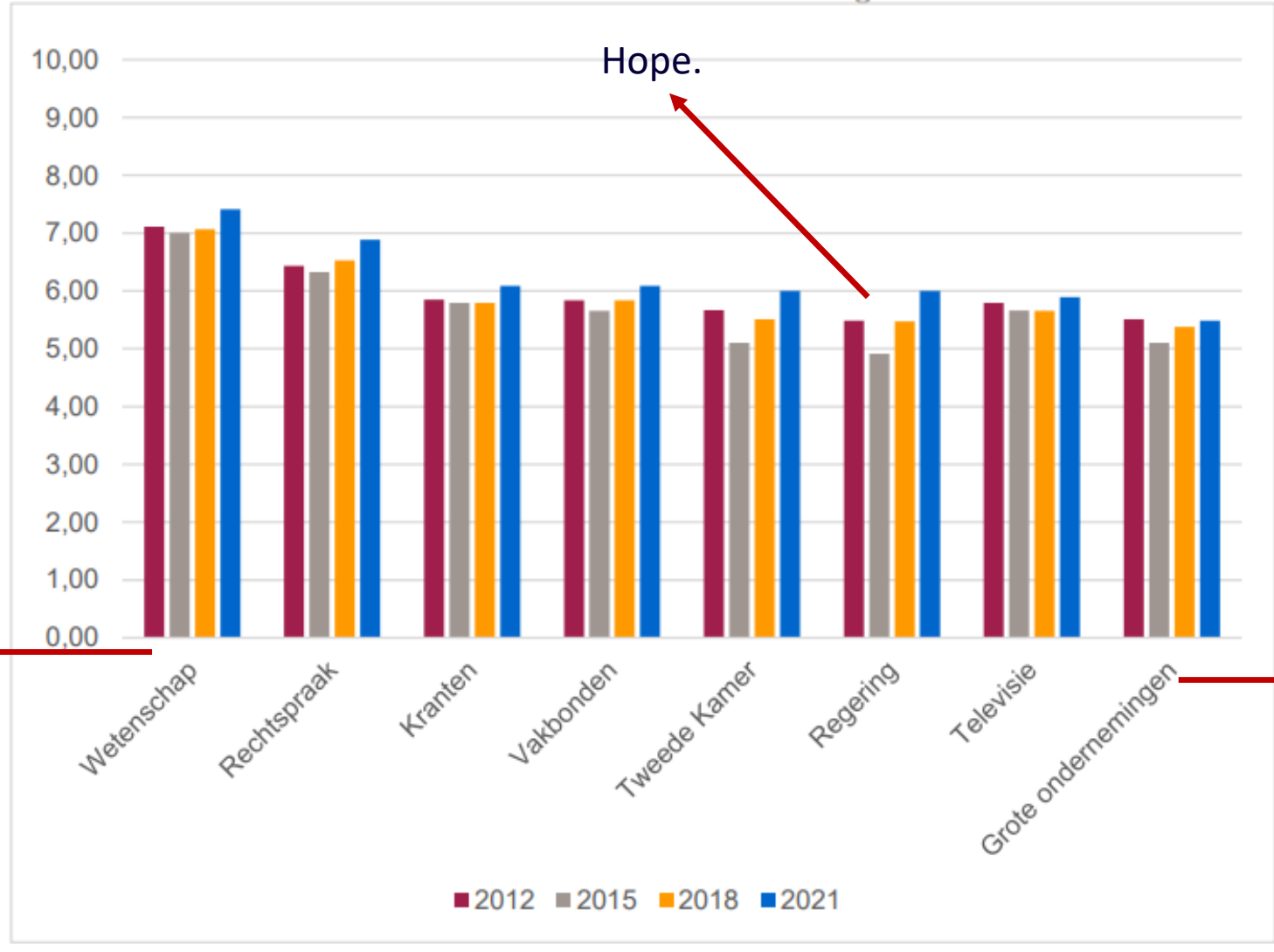
(right panel: de Correspondent/ IPCC/Irena average costs for 1 MW)



An adult/fully developed petrochemical market
Continuing to do what they know to do well (such as thermal cracking)

Science: high trust, high expectations. Industry: Low trust, low expectations.

Grafiek 1. Gemiddeld vertrouwen van Nederlandse burgers in instituties.



Finally ETS starts to hurt.
Emissions are quickly becoming expensive.

Human kind will innovate its way out of the mess it created.

?

Or will it regulate its way out??

Too naive

Too immoral

A grim turn: how long will we still sit here together?

Longlasting relations between organisations and researchers holding on to the dream. Numerous public-private partnerships.

After 20 years I believe reality is catching up on us.

Society is running out of patience. Students are running out of patience. Politics is running out of patience. We're running out of time.

For me personally: running out of trust that the CEO of the company of the corporate partners in the project will choose to do the right thing, without an authority using force.



NOS Nieuws • Woensdag 15 februari, 18:48 •
Aangepast donderdag 16 februari, 02:08

Acties tegen fossiel op universiteiten: wel of geen samenwerking?

Tweede universiteit ter wereld

VU stopt samenwerking met fossiele bedrijven: 'Belangrijk signaal'

Door Bart Verheggen

21 april 2023 14:49 • Aangepast 23 april 2023 11:38



Net b

16:23

16:17

16:15

16:08

I never had a talent for nuance



2005? BSc life sciences

Column for university newspaper in Leiden.

Were my dreams too big?

Were my expectations too unrealistic?

2023, writer & columnist

Am I right to be this disappointed?

Tell me why I am wrong.

Tell me why biotech is more than a niche in the transition, or will be soon.



Tell me why your project, your technology will make a credible, scalable difference. Not too far in the future. Please.

Tell me why your project deserves our trust.

Greenwashing or true transition? Public (dis)trust in the chemical industry.

Rosanne Hertzberger