

The Ethics of Transitions

Course at JRC-Ispra, September 2023



Where to find this talk: www.andreasaltelli.eu



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August 25 2023: The politics of modelling is out!



Praise for the volume

"A long awaited examination of the role—and obligation—of modeling."

Nassim Nicholas Taleb, Distinguished Professor of Risk Engineering, NYU Tandon School of Engineering. Author, of the 5-volume series *Incerto*.

"A breath of fresh air and a much needed cautionary view of the ever-widening dependence on mathematical modeling."

Orrin H. Pilkey, Professor at Duke University's Nicholas School of the Environment, co-author with Linda Pilkey-Jarvis of *Useless Arithmetic: Why Environmental Scientists Can't Predict the Future*, Columbia University Press 2009.

"The methods by which power insinuates itself

Mastodon Toots by

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2023/8/28 11:24

August 26 Podcast (16m) - interview for ABC NET RADIO, AUS: Assumptions and consequences: the politics of modelling, Guests: Ehsan Nabavi and Andrea Saltelli, Producer - Chris Bullock.

abc.net.au/listen/programs/sun

View on mstdn.social

- Truth or justice?
- Roger Pielke
- Mary Douglas cultural theory of risk
- Myths of Nature
- Wynne's and Winner's dissent
- Vaclav Smil's Energy transitions
- The economy of promises
- Digital Twins for the transition?
- Jasanoff
- Papers in JESP Neutrality and Lenses

Pursuit of truth or pursuit of justice?

Can a scientist be an activist?

Can a scientist not-be an activist?

The case of the transition to a carbon-free future

The Latin motto

Fiat justitia ruat caelum

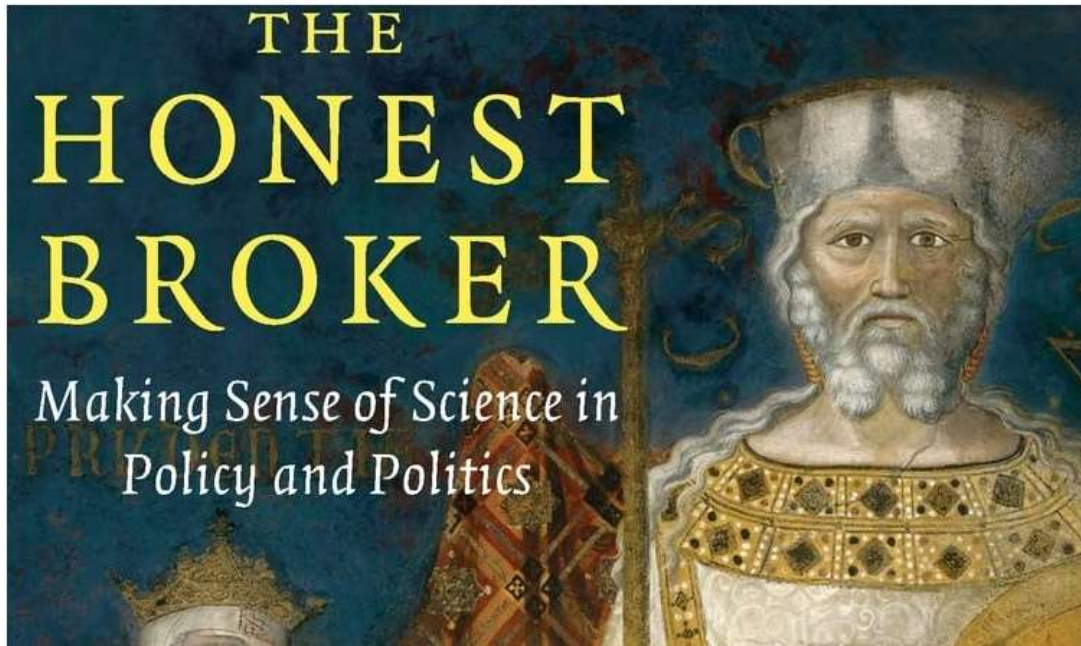
Could easily be morphed into

Fiat veritas ruat caelum



Source: René Goscinny's Asterix comic

Both formulations clash with ... *prudentia*?



Cambridge
University Press,
2007



Roger Pielke
<https://rogerpielkejr.com/>



The Honest Broker

Making sense of science, policy and politics

By Roger Pielke Jr.  · Over 15,000 subscribers

Value consensus and low uncertainty?

Yes

No

Connected to policy

Reduce scope of choice

Yes

No

Yes

No

Science arbiter

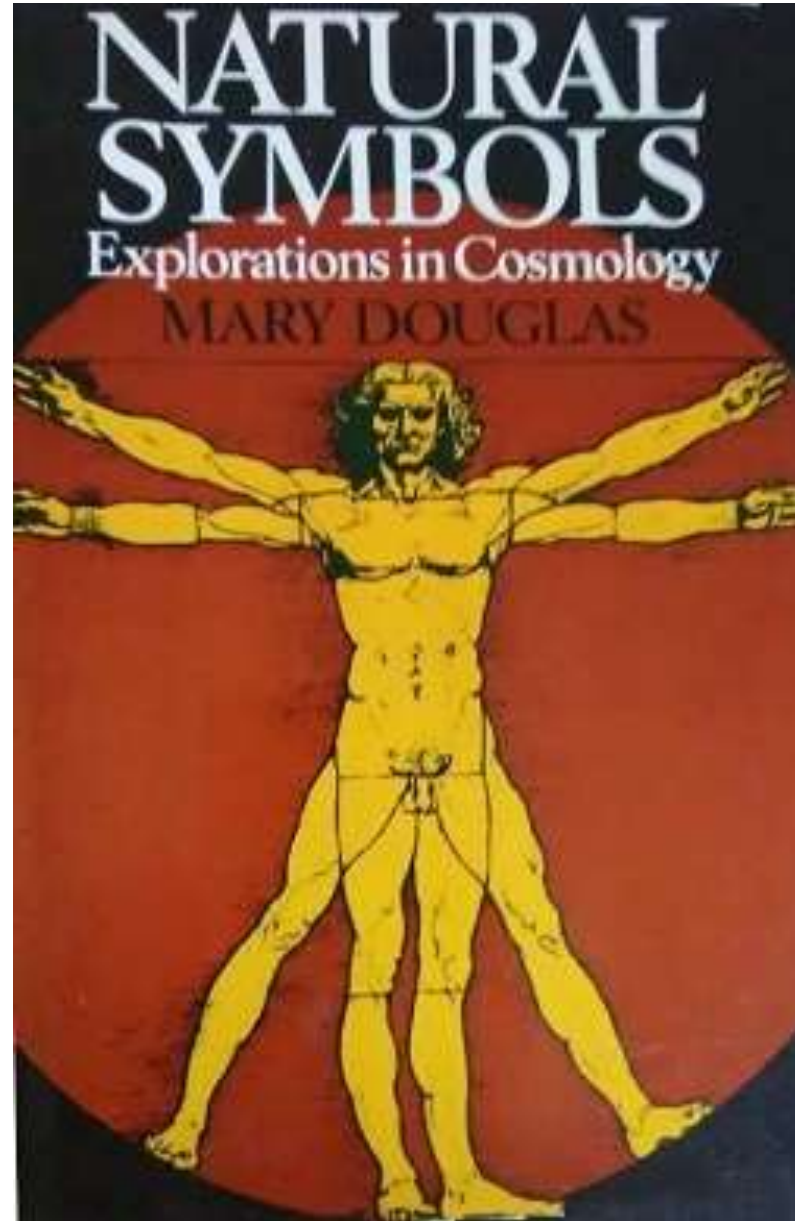
Pure scientist

Issue advocate

Honest broker

Mary Douglas' cultural model of risk

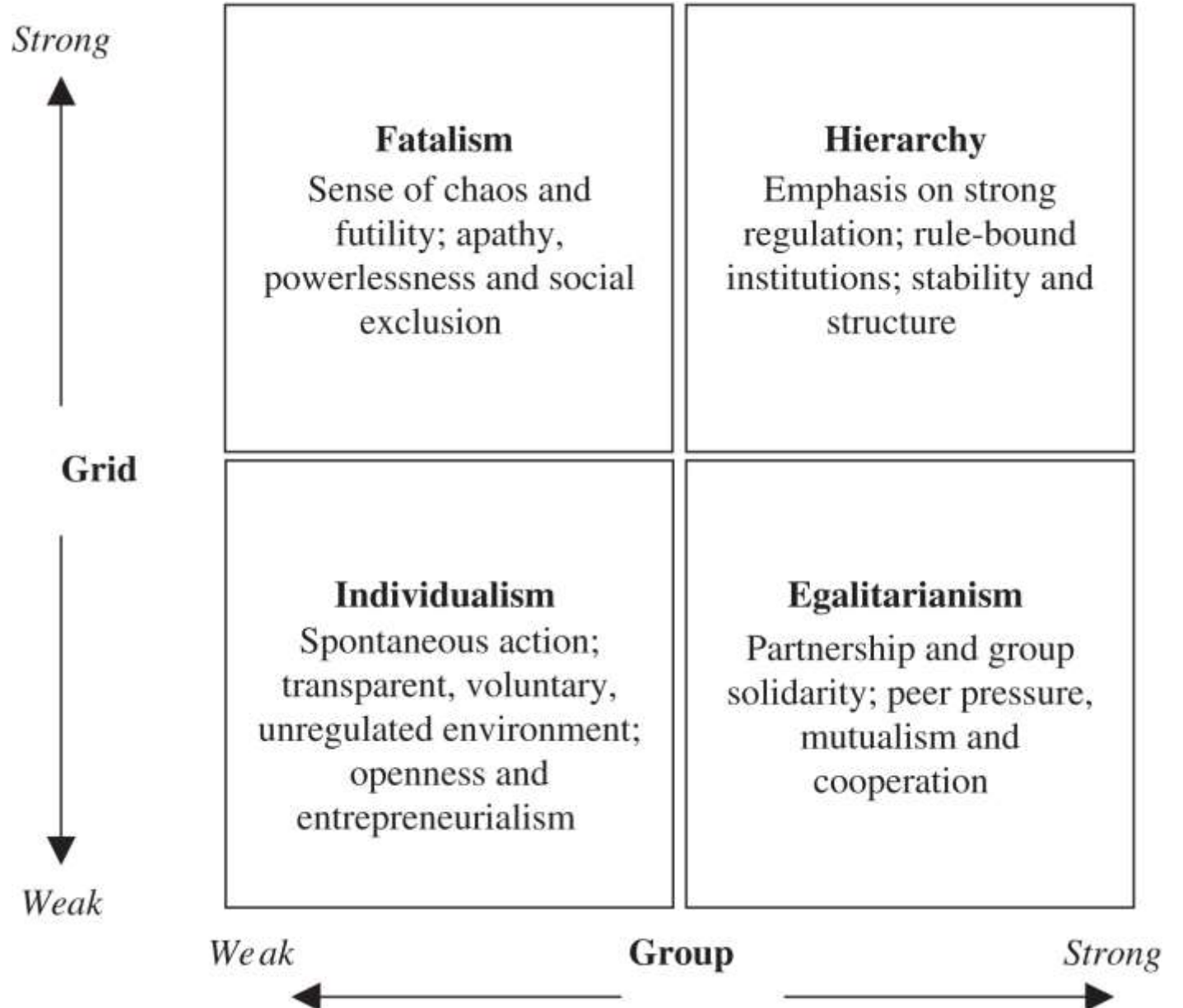
Douglas, M. (1970). *Natural symbols: Explorations in cosmology*, London: Cresset Press.



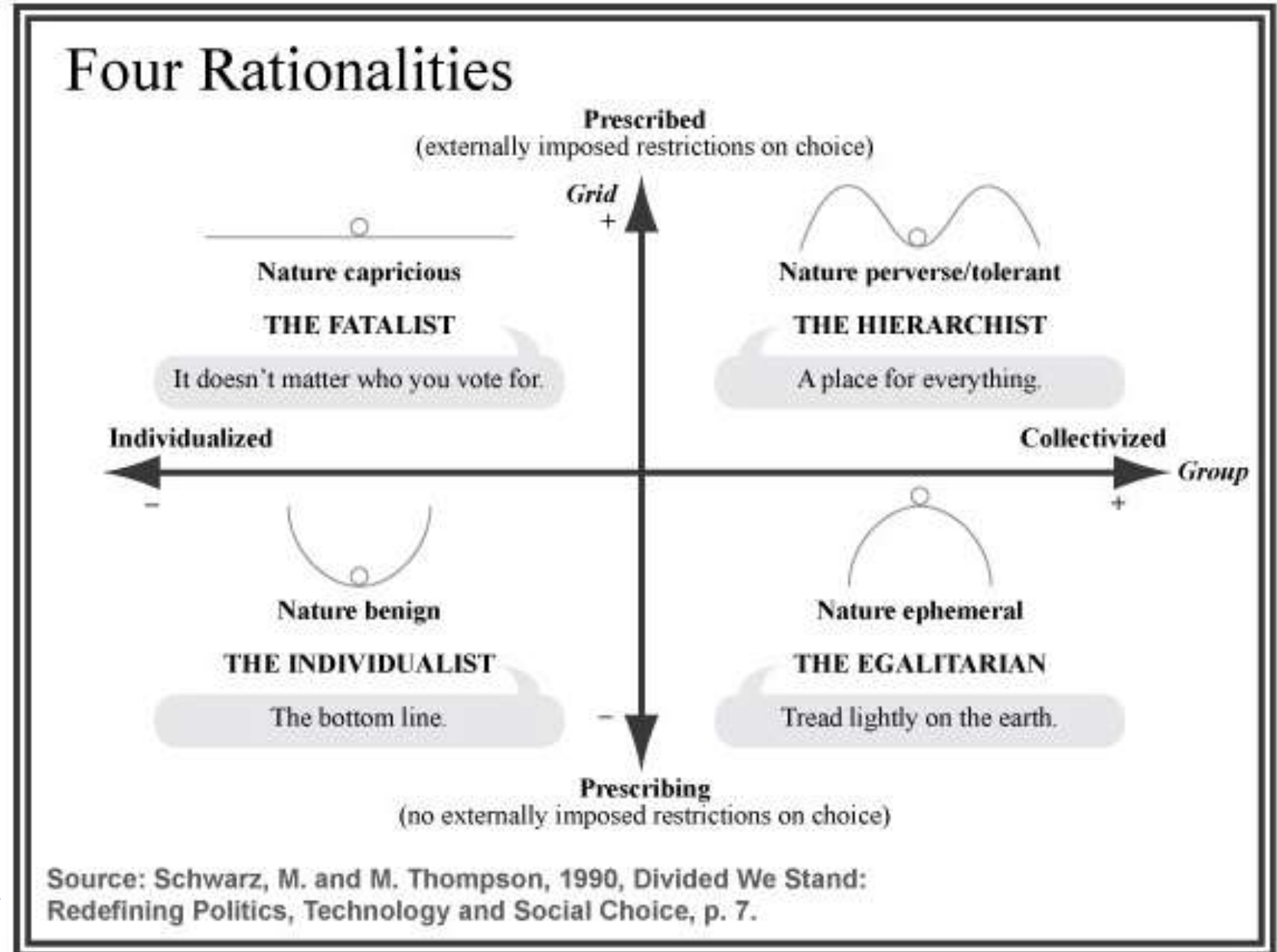
Mary Douglas
(1921-2007)

Group
degree of
incorporation
within a bounded
social unit

Grid
degree of social
prescriptions and
externally imposed
rules, with
established
hierarchies



Myths of Nature
(Schwarz and
Thompson, 1990)



Myths of Nature (Schwarz and Thompson, 1990)



Nature is capricious

Natural systems are unpredictable



Nature is tolerant, but within limits

Natural systems can cope with disturbances, if these stay within certain boundaries



Nature is benign

Natural systems are resilient and able to deal with large disturbances



Nature is ephemeral or fragile

In natural systems, a small disturbance may have enormous impacts

Source: Sander C. S. Clahsen et al., 2018, Why Do Countries Regulate Environmental Health Risks Differently? A Theoretical Perspective, Risk Analysis, DOI: 10.1111/risa.13165

Several approaches to regulating risk reviewed here

Risk Analysis, Vol. 00, No. 0, 2018

DOI: 10.1111/risa.13165

Why Do Countries Regulate Environmental Health Risks Differently? A Theoretical Perspective

**Sander C. S. Clahsen,^{1,2,*} Irene van Kamp,¹ Betty C. Hakkert,³ Theo G. Vermeire,³
Aldert H. Piersma,^{2,4} and Erik Lebret^{2,5}**

… and yet this work (not necessarily the approaches it reviews) is paradigmatic of a vision of policy (or human affairs) where ‘risk’ is the substance of the matter

Risk Analysis, Vol. 00, No. 0, 2018

DOI: 10.1111/risa.13165

Why Do Countries Regulate Environmental Health Risks Differently? A Theoretical Perspective

**Sander C. S. Clahsen,^{1,2,*} Irene van Kamp,¹ Betty C. Hakkert,³ Theo G. Vermeire,³
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Risk is mostly perceived in relation to health, and is hence quantified by science. Additionally risk is also the result of a perception, and can thus be investigated, again by science

Why Do Countries Regulate Environmental Health Risks Differently? A Theoretical Perspective

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As a result, technology resistance is interpreted as misplaced or erroneous risk perception, which in turn can be attributed to incomplete or deficient scientific understanding of the lay-person

Why Do Countries Regulate Environmental Health Risks Differently? A Theoretical Perspective

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Aldert H. Piersma,^{2,4} and Erik Lebret^{2,5}

This is the so-called 'deficit model' – a sort of hydra



Source: <https://www.dndbeyond.com/monsters/16929-hydra>

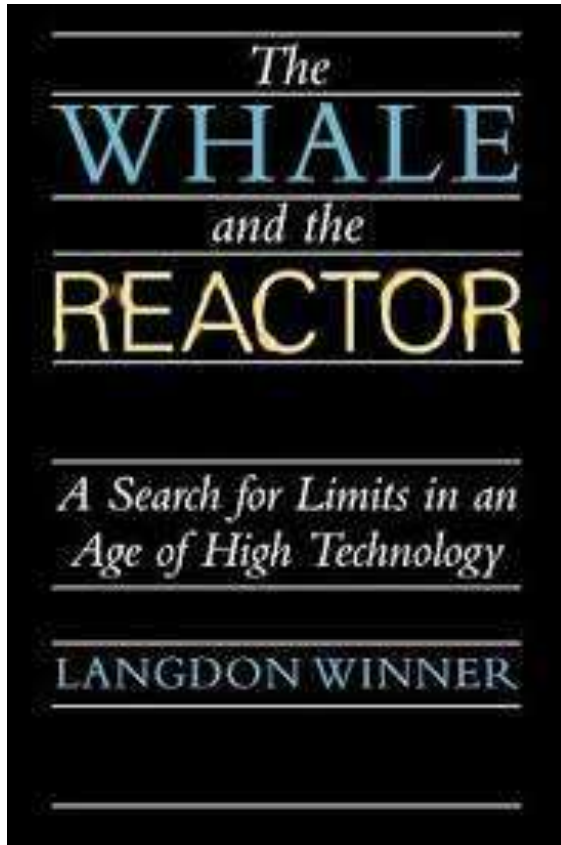
Different things can be at risk beside health, e.g. democracy, agency, justice, fairness, fundamental beliefs ...

Why should (health) risk dominate regulatory and policy narratives?

Winner (1986): ecologists should not fall into the trap of cost benefit analysis and risk analyses



Langdon Winner



(Chapter ON NOT HITTING THE
TAR-BABY)

Winner, L., 1986. *The Whale and the Reactor: a Search for Limits in an Age of High Technology*. The University of Chicago Press, 1989 edition.

The deficit model
Who defines public meanings?
Science's hermeneutic imperialism

Special Issue: Public Engagement in Science



**Further disorientation in
the hall of mirrors**

Public Understanding of Science
2014, Vol. 23(1) 60–70
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DOI: 10.1177/0963662513505397
pus.sagepub.com



Brian Wynne

Lancaster University, UK; University of Oslo, Norway

“After seamlessly extending from informing policy, to justifying resultant political commitments, science now plays a further role ... as de facto author of public meanings, thus also of proper public concerns”

This results in a confusion of the role of science

Special Issue: Public Engagement in Science



**Further disorientation in
the hall of mirrors**

Brian Wynne

Lancaster University, UK; University of Oslo, Norway

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2014, Vol. 23(1) 60–70
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“.. a problematic presumption... that scientific meanings themselves, as given to public objects like ‘risk’, are also just facts, which therefore have natural proper authority over those of non-experts”

Special Issue: Public Engagement in Science



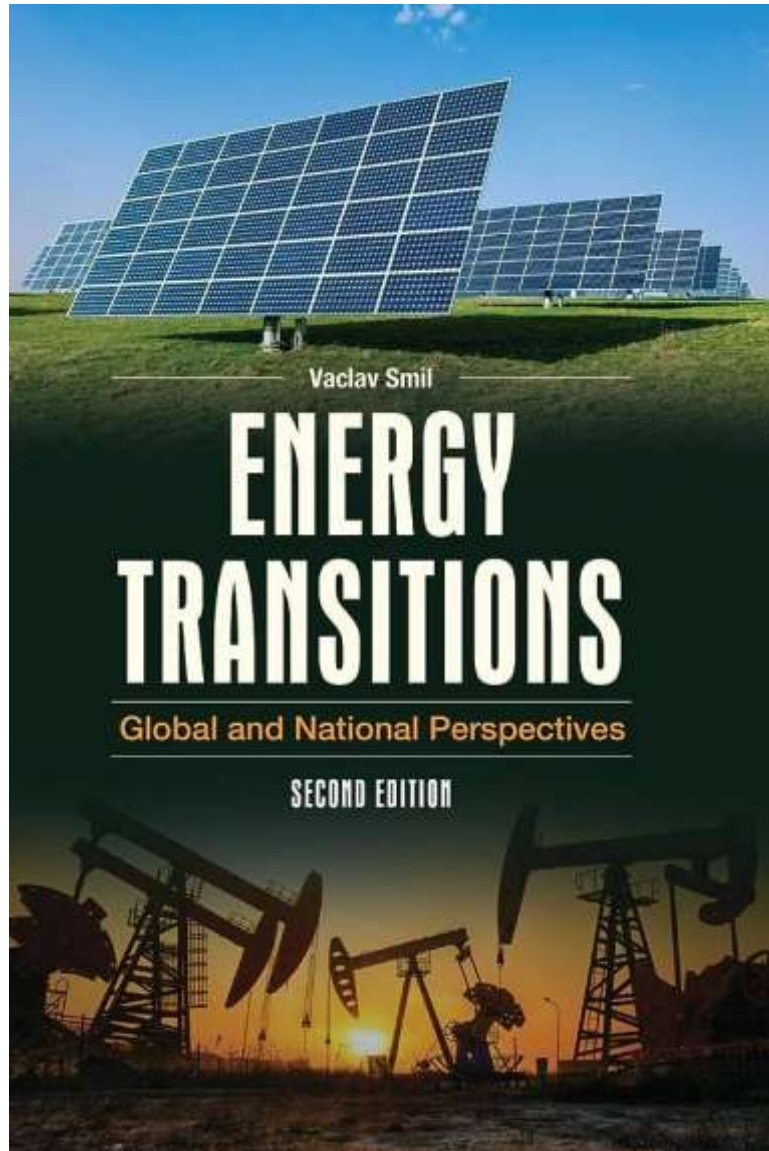
Further disorientation in the hall of mirrors

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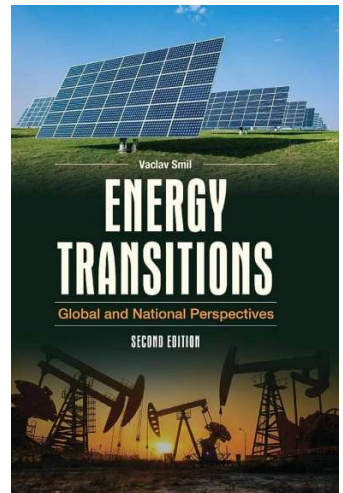




Vaclav Smil

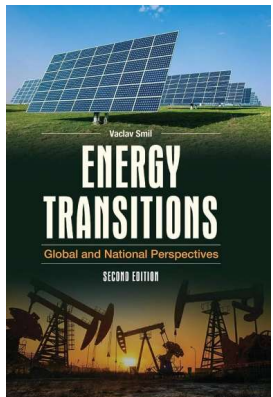
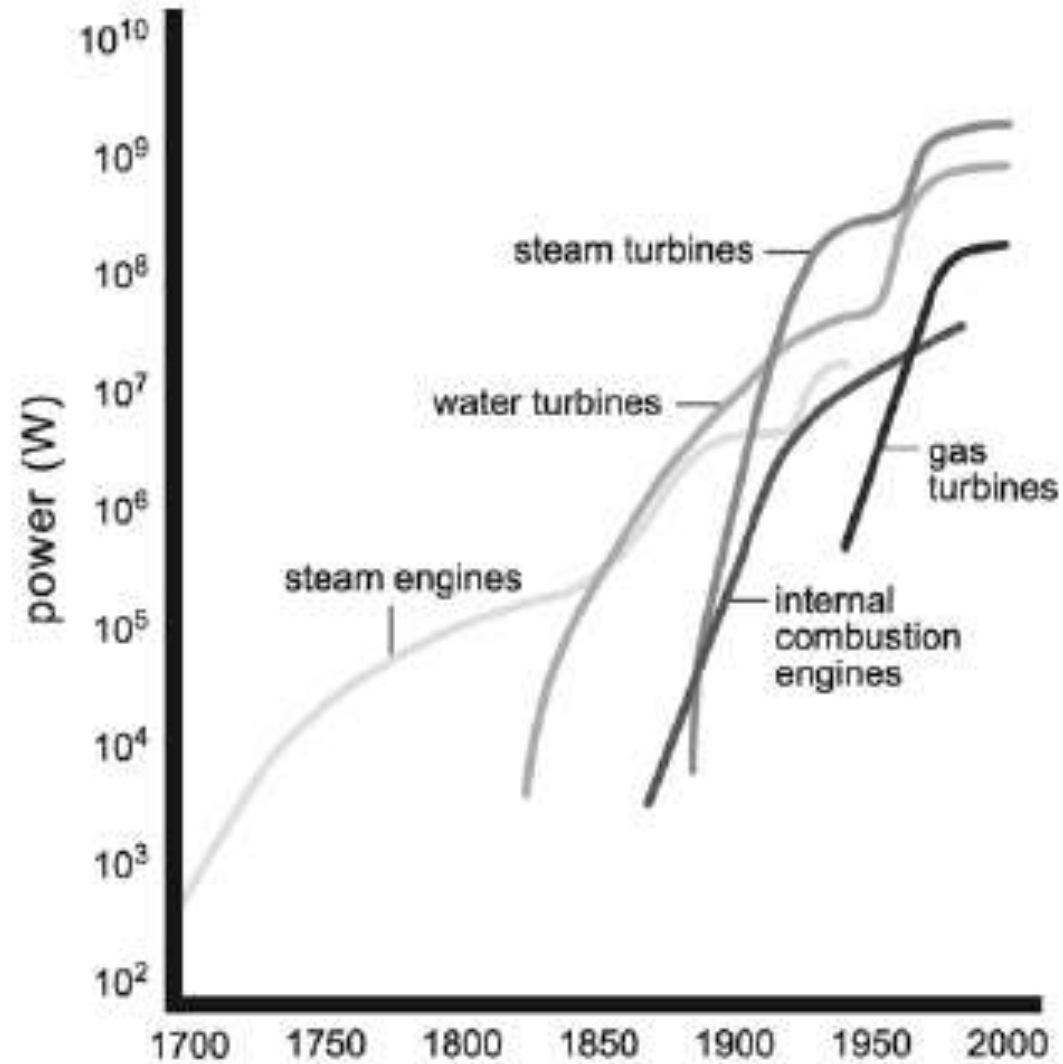
Promise of rapid transformation away from fossil fuels are often based on misconceptions

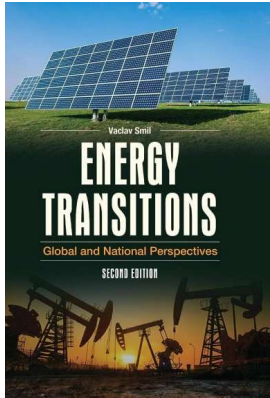
- Confusing installing capacity of renewables with actual energy output
- Confusing contribution to energy generation from renewables with fraction of total energy utilization



Energy transitions are more than a change in the fuel base (wood, charcoal, carbon, oil, renewables...) but involve primary energy movers

Figure 2.11 Maximum capacities of inanimate prime movers, 1700–2000. Based on Smil (1994).





History of past transition shows “gradual, prolonged affairs with new sources taking decades to become significant contributors”

Figure 2.12 Fisher-Pry plot of the global primary energy transition from biomass fuels to coals, hydrocarbons, and primary electricity, 1800–2010. Data points calculated from statistics in UNO (1956 and 1976) and BP (2009). The most remarkable phenomenon is the post-1970 stasis of all fossil fuel shares.

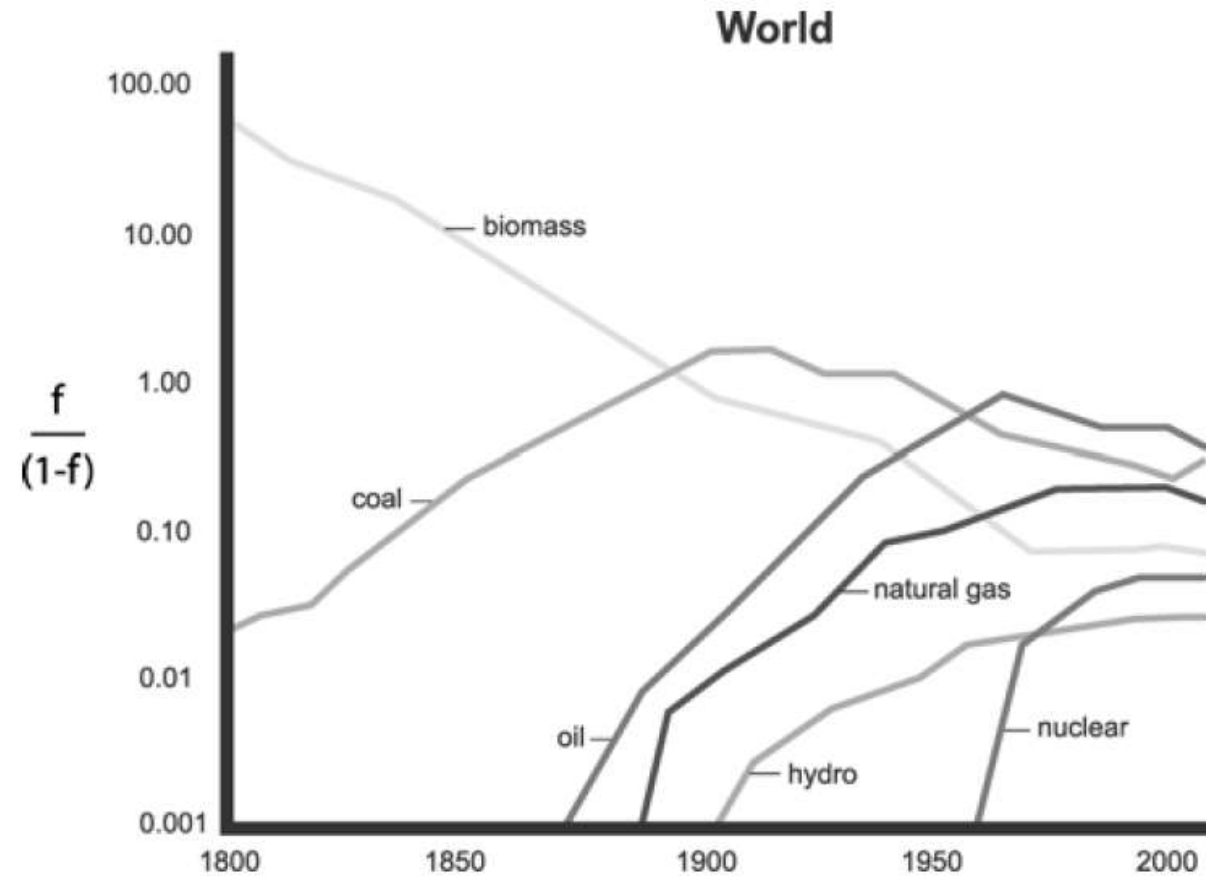
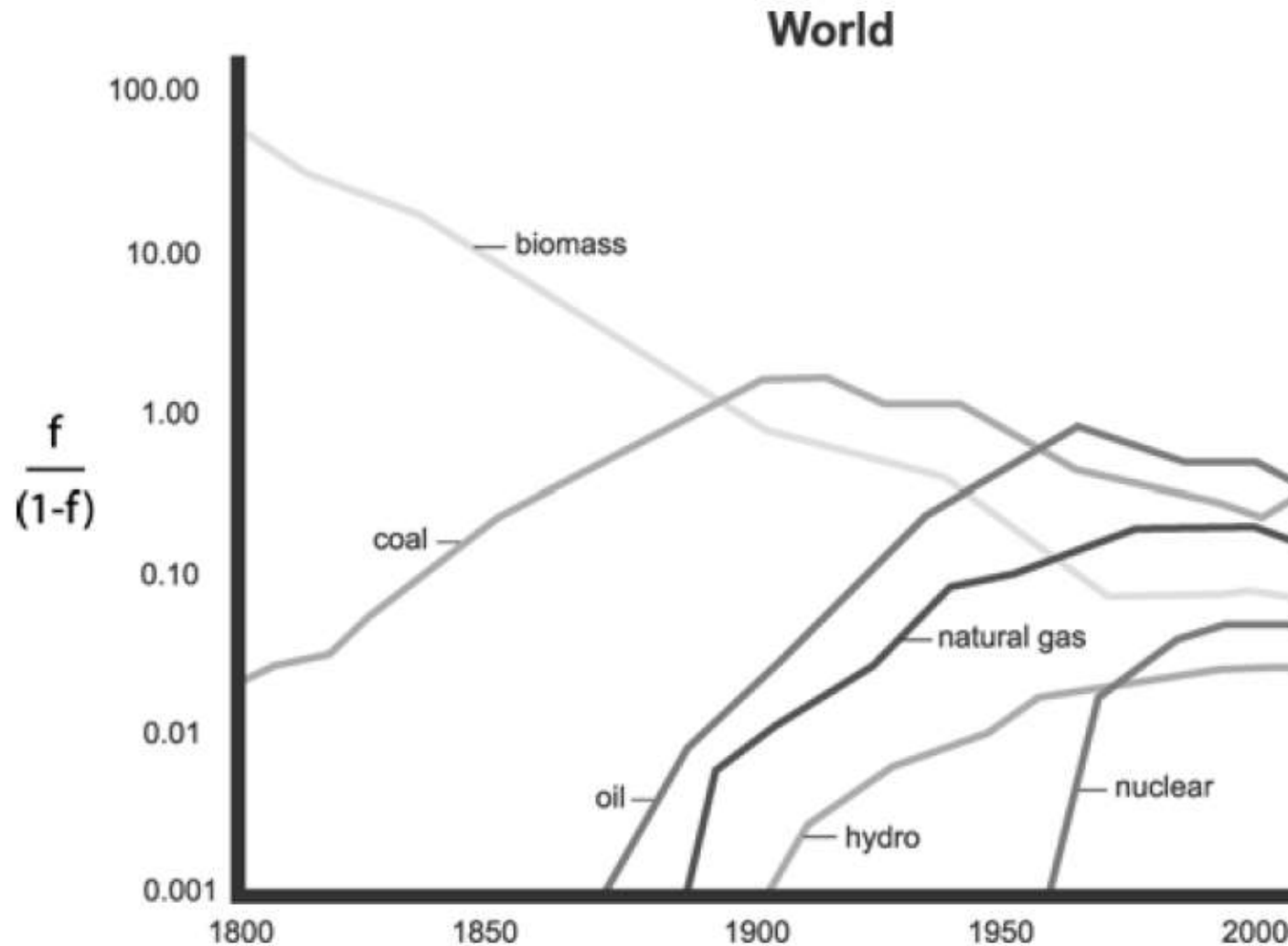


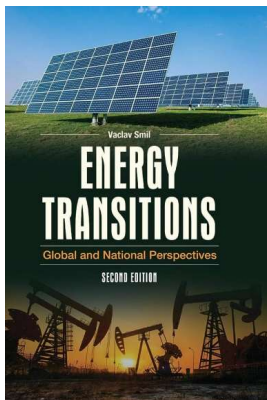
Figure 2.12 Fisher-Pry plot of the global primary energy transition from biomass fuels to coals, hydrocarbons, and primary electricity, 1800–2010. Data points calculated from statistics in UNO (1956 and 1976) and BP (2009). The most remarkable phenomenon is the post-1970 stasis of all fossil fuel shares.



$$\frac{1}{f} \frac{df}{dt} = r_0(1-f)$$

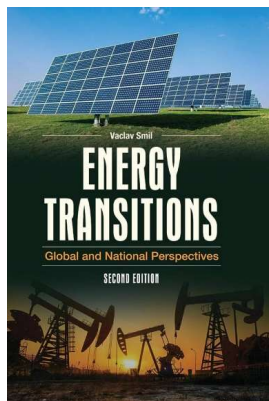
$$\frac{f}{(1-f)} = \exp(r_0 t)$$

Fisher-Pry model



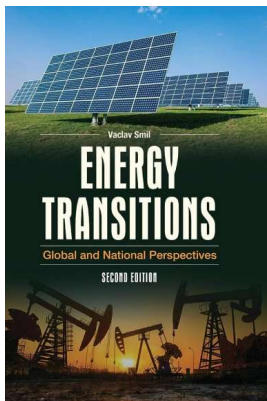
Five factors of the challenge

- Overall scale of the shift
- Magnitude and distribution of renewable
- Lower energy density of biofuels replacing liquid and solid fossil
- Intermittency of renewables
- Lower power densities of renewables



Unavoidable surprises

- Who would have predicted in the 70's (all dams are good) the present hesitancy (not even the World Bank now thinks the same)
- Who would have predicted in 1965 when nuclear were set to boom that nuclear would become a contested option in just two decades



Source: Wikipedia Common

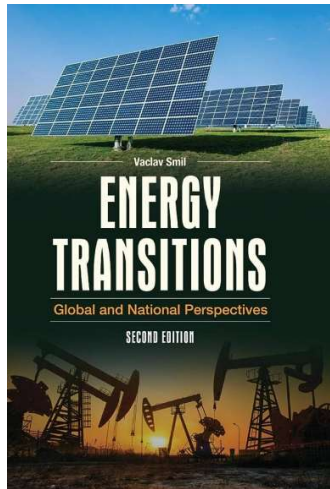
Lewis Strauss's 1945 prophecy of nuclear power 'too cheap to meter'

Trivia: The 'villain' in the latest Oppenheimer movie



Bold predictions

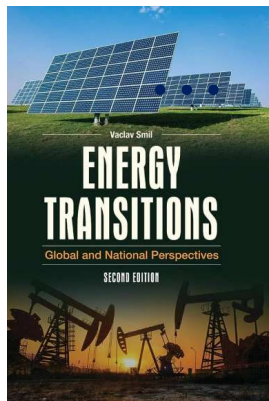
“The uselessness of the 2100 scenario, equivalent to envisaging the energy realities of 2015 from the perspectives of 1930 is all too obvious...”



“Robust optimism or naïve expectations”, p. 164

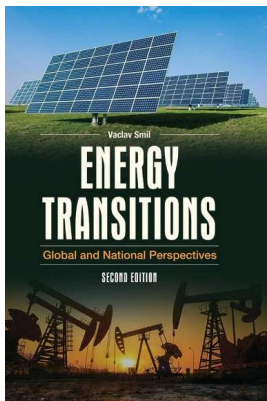
Al Gore in 2008: 100% electricity by renewable in ten years

CEC (now EC) in 2008: energy consumption from renewable in 2020 will reach 20%



The mixed record of Energiewende (p. 169–173)

2014: wind and solar contribute 22% to all primary energy derived from renewables while biomasses are at 60% “in order to meet its post 2020 targets Germany will have to import biomass, outsourcing impacts to the US South



OPINION ENERGY

Germany's Energiewende, 20 Years Later >

Germany's far-reaching program to reduce the share of fossil fuels in energy has achieved almost exactly what the United States achieved, but at greater expense

BY VACLAV SMIL | 25 NOV 2020 | 3 MIN READ



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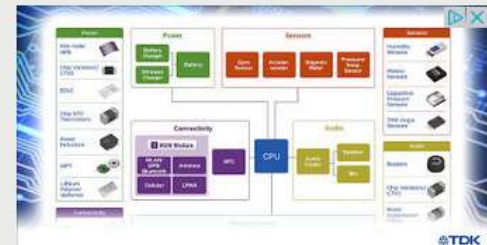
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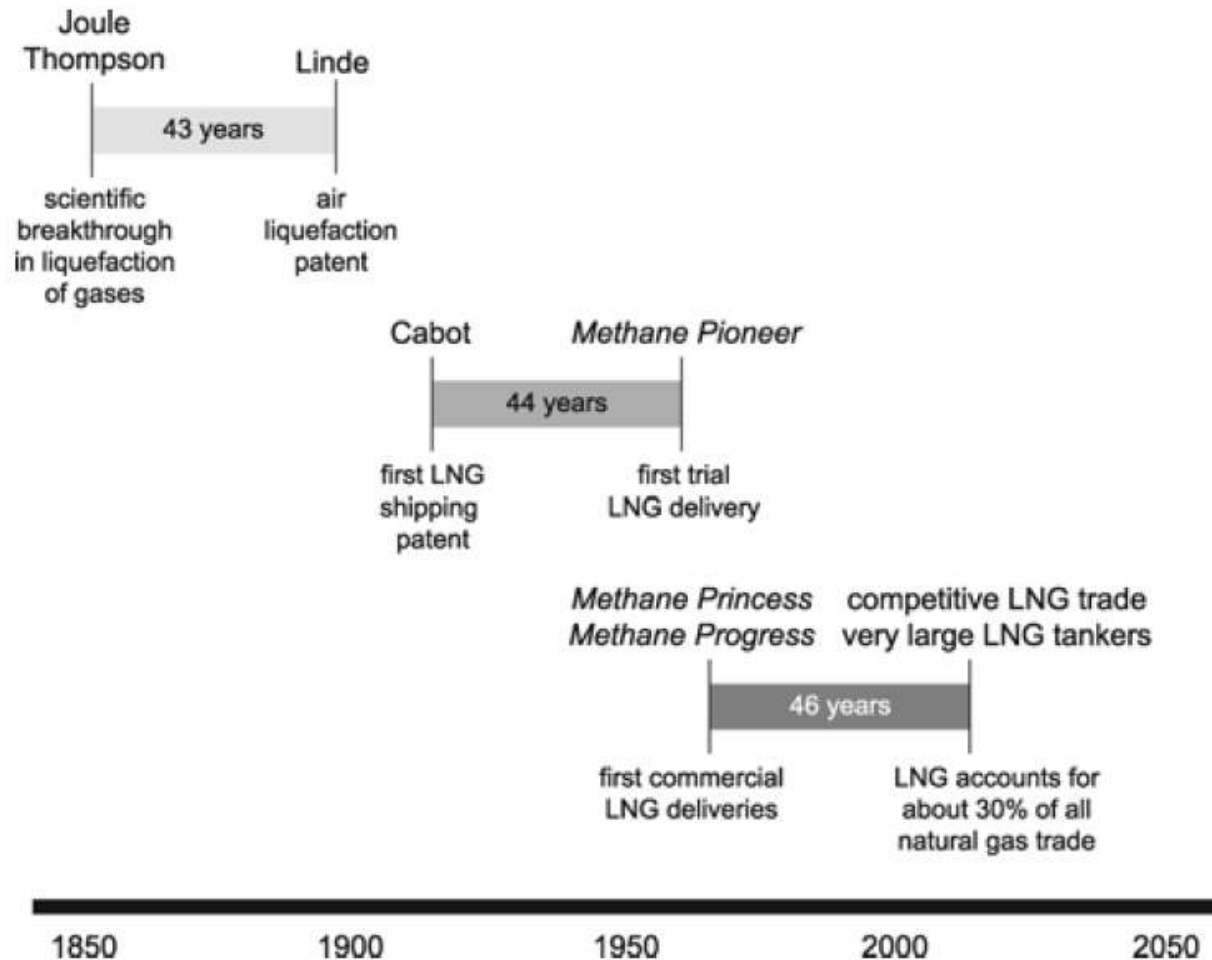
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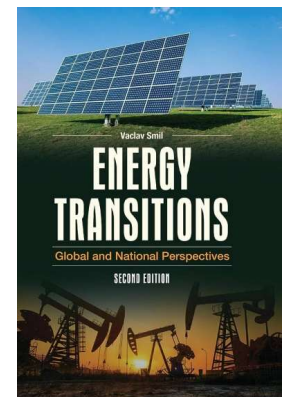


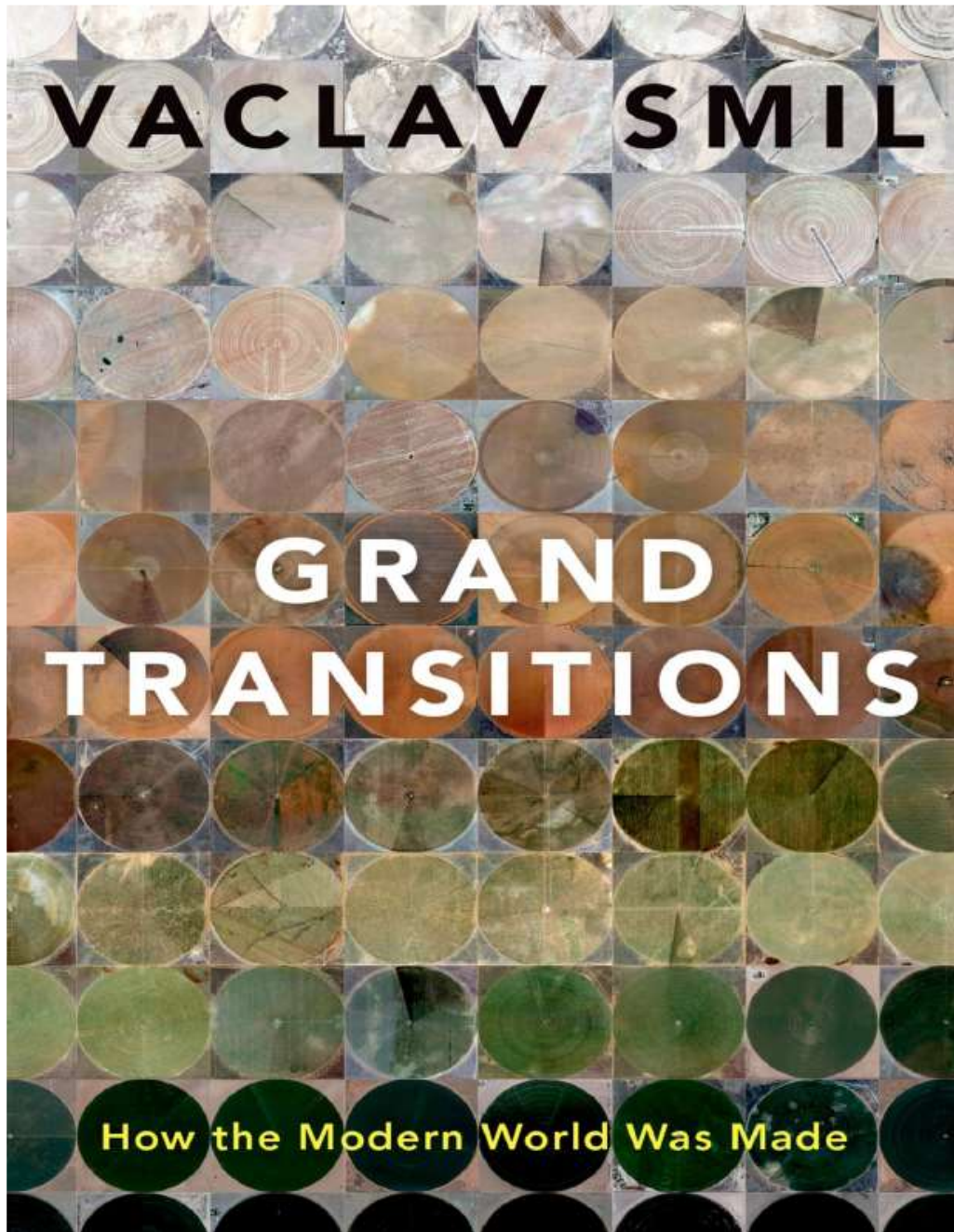
TDK

Figure 1.4 History of LNG shipments illustrates often very long time spans required for the maturation and diffusion of innovations in energy extraction, transport, and conversion.



Even a transition apparently uneventful as LNG has had its stop and go ... and the 2022–2023 war has put the issue back on the agenda





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(2021)

More recent work (2021)

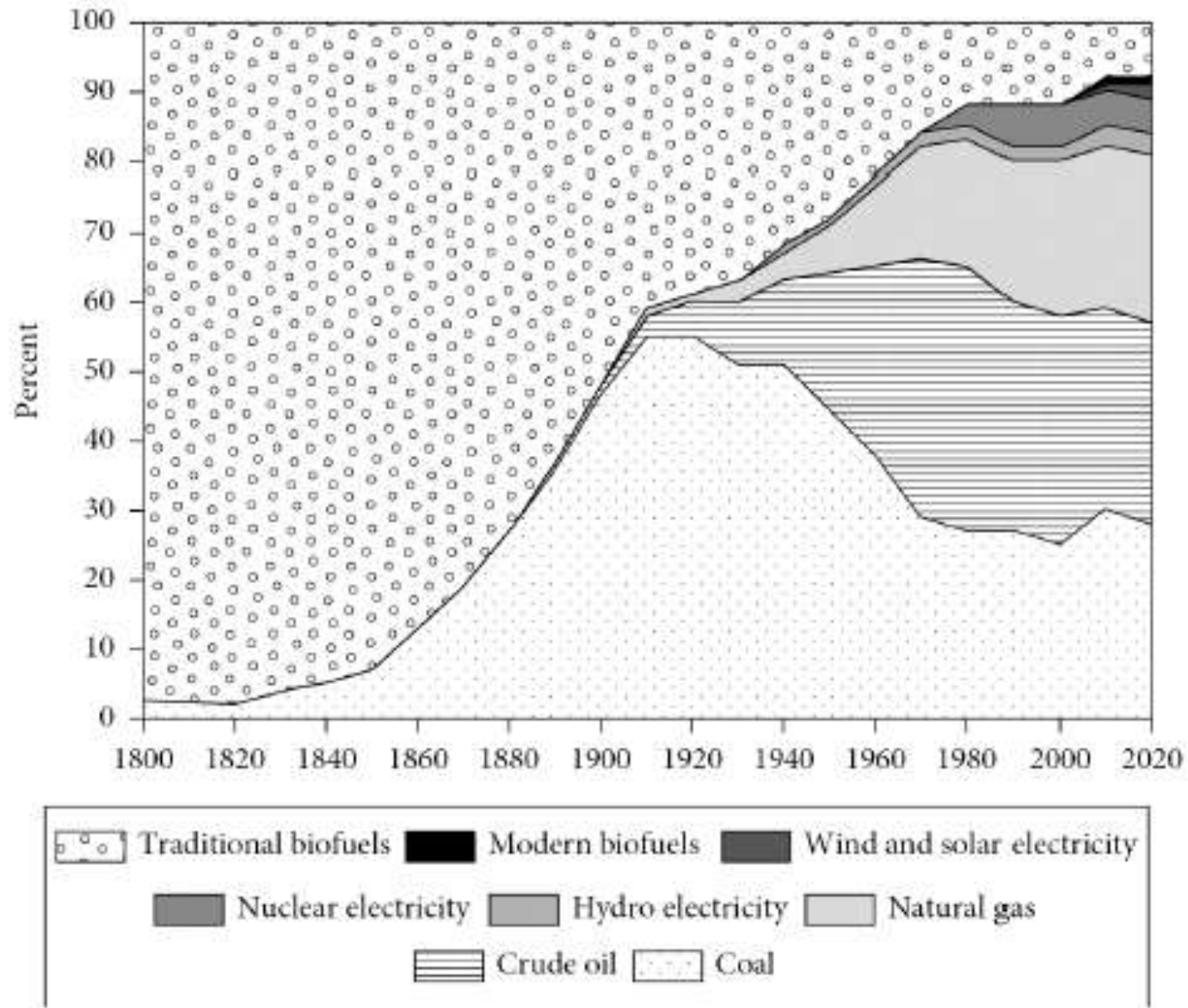
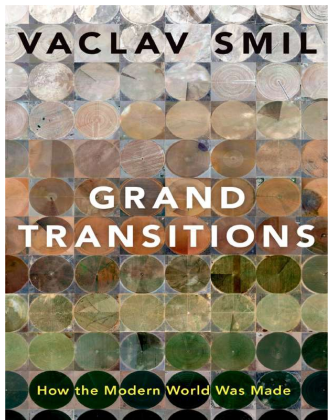


Figure 4.3 Global energy transitions, 1800–2015. Based on Smil (2017b).



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The more things change, the more they stay the same: promises of bioeconomy and the economy of promises

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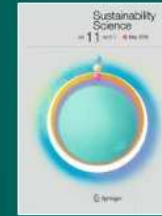


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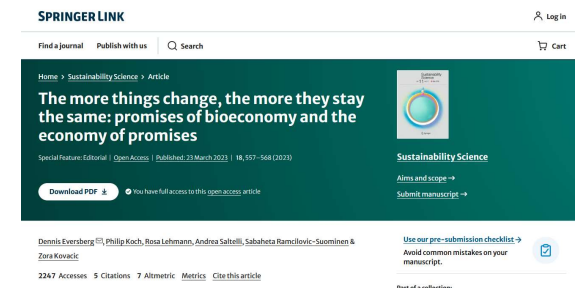


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“... promises of far-reaching change made by recent bioeconomy policies are in fact strategically directed at avoiding transformative change to existing societal arrangements”

→ “We live in a world of limited resources. Global challenges like climate change, land and ecosystem degradation, coupled with a growing population force us to seek new ways of producing and consuming that respect the ecological boundaries of our planet” (European Commission 2018, p. 4)

→ “... rapid, concerted and sustained changes in lifestyle and resource use that cut across all levels of society and the economy” (European Commission 2012, p. 3)



The screenshot shows the Springer Link interface for an article. At the top, it says 'SPRINGER LINK' with a search bar and 'Log In' button. Below that, there are navigation links: 'Find a journal', 'Publish with us', and 'Search'. The main content area has a dark green background with the article title 'The more things change, the more they stay the same: promises of bioeconomy and the economy of promises' in white. To the right of the title is a small circular graphic. Below the title, it says 'Special Feature: Editorial | Open Access | Published: 23 March 2023 | 18, 557–568 (2023)'. There is a 'Download PDF' button and a note 'You have full access to this open access article'. On the right side, there is a 'Sustainability Science' logo and links for 'Aims and scope' and 'Submit manuscript'. At the bottom, there is a list of authors: 'Dennis Eversberg, Philip Koch, Rosa Lehmann, Andrea Salzelli, Sabaheta Ramilovic-Suominen & Zora Kovacic'. There are also statistics: '2247 Accesses', '5 Citations', '7 Altmetric Metrics', and a 'Cite this article' link. At the bottom right, there is a 'Use our pre-submission checklist' link and a 'Part of a collection' link.

Benefits such as combating climate change, helping restore ecosystems, halting land degradation and reducing food waste while delivering new jobs in a sustainable ‘circular economy’ (European Commission 2018, pp. 5–7) are not to result from changes in lifestyles

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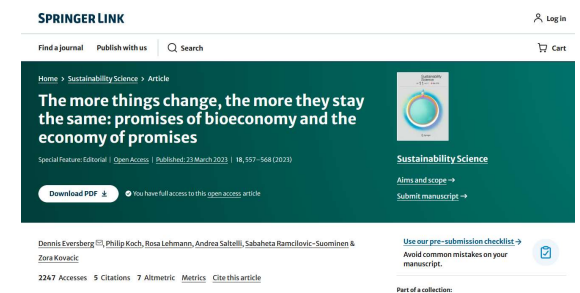
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Rather, [these achievements] are presented as resulting from ‘unprecedented advances in life sciences and biotechnologies, as well as innovations merging the physical, digital and biological worlds’ (European Commission 2018 p. 6)



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A model where “more of the same in technological advance and economic expansion will transform societies toward sustainability without actually transforming anything substantial about them”

Innovation here becomes a magic wand that help defuse the political nature of the problem, and to reframe it as a technical one



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In the paper, we talk of “economics of techno-scientific promises’ (ETP)”

… The promise of ‘transformation without transformation’



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ETP mobilizes the authority of science and its supposed impending breakthroughs as the mode of achieving change

This amounts to a ‘production of irreversibility’ and ‘lock-ins’ that renders society dependent and can progressively lock out any other solutions (P.-B. Joly)

DÉBORDEMENTS | Madeleine Akrich, Yannick Barthe, Fabian Muniesa, et al.



On the economics of techno-scientific promises

Pierre-Benoît Joly

p. 203-221

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Governments supply imagery such as that of the “bioeconomy airport” ... plant-based unbreakable window panes and moss walls to filter out air pollution → ‘change’ in the lobby while wide-body planes burning hundreds of tons of fossil kerosene keep taking off from the runway ... hypocrisy that rich societies can avoid changes to modes of living based on unprecedented levels of resource and energy use ...

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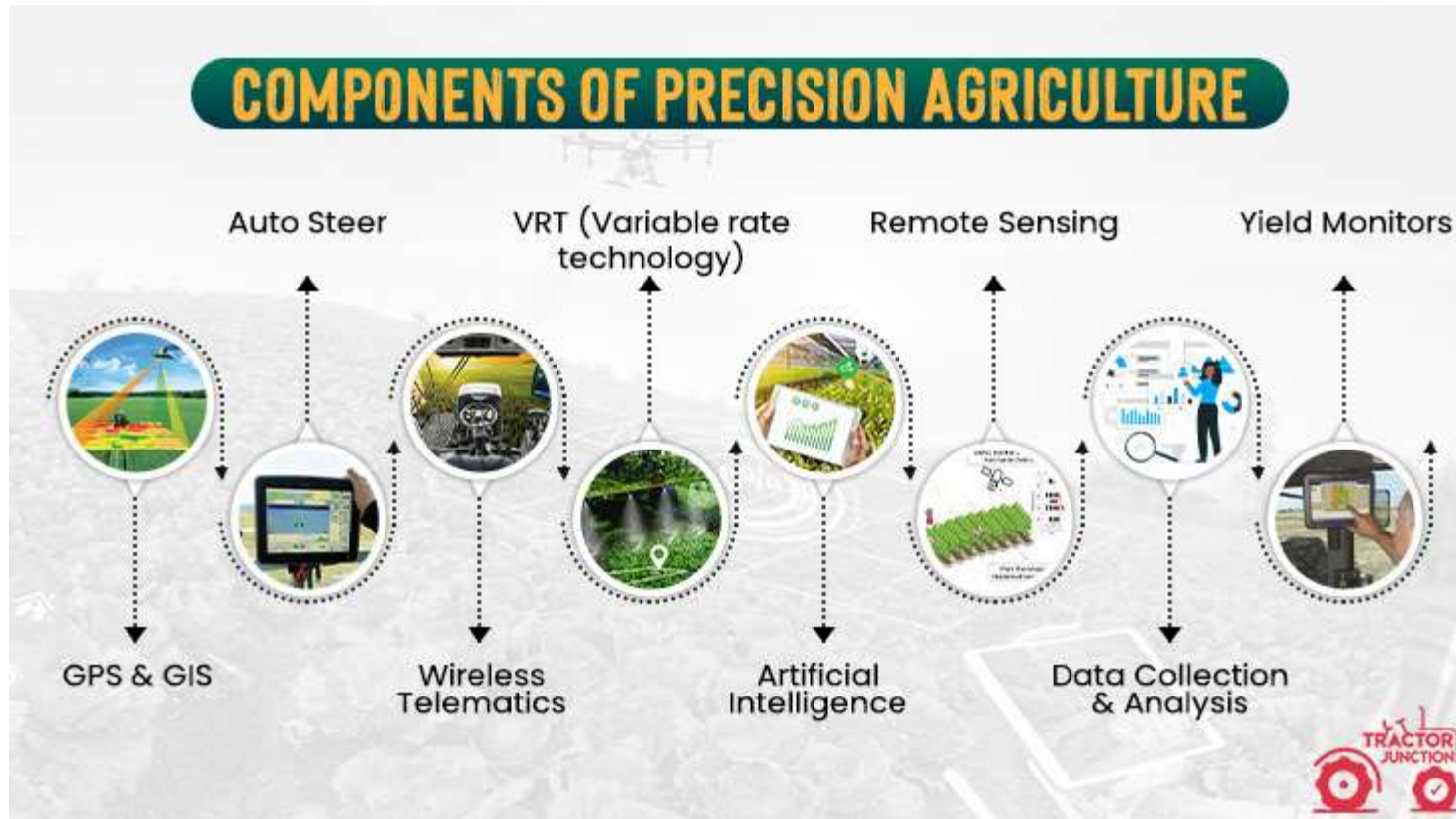
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... technologies promising to boost biomass production by improved control over genetic and environmental factors (GMOs, precision agriculture), ...



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Source: <https://www.tractorjunction.com/blog/what-is-precision-farming/>

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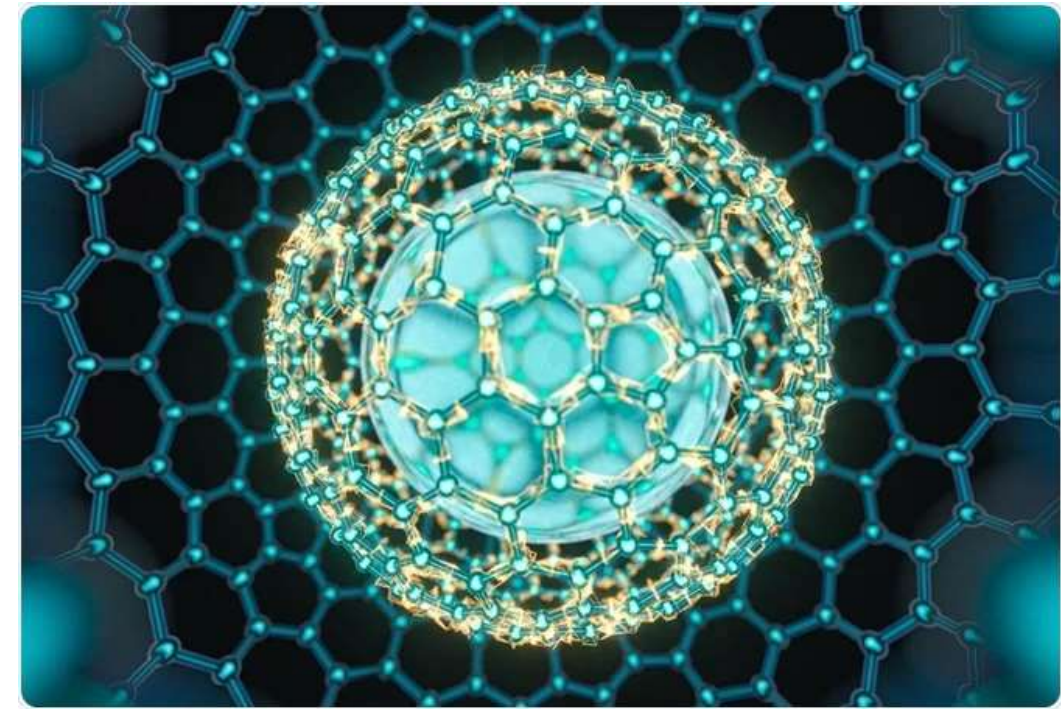
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... and/or substitute fossil-based materials and processes as bio-based drop-in replacements, such as tires made from dandelion or biopolymers produced by genetically modified bacteria



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Source: <https://weibold.com/continental-receives-award-for-tires-made-from-dandelion-rubber>

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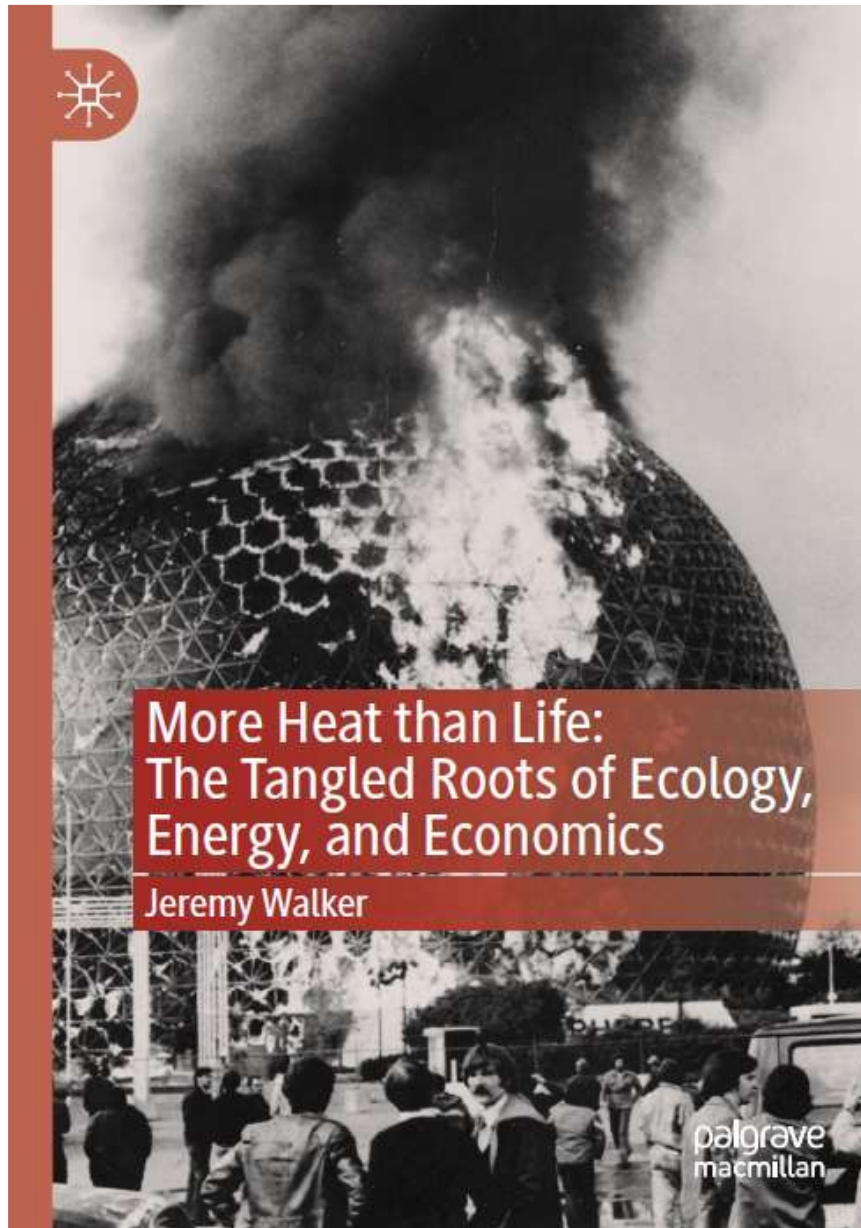
bioeconomy policies: contradictory efforts to deal with the destructive effects of economic expansion while at the same time attempting to keep it going at all costs



Anyone who believes exponential growth can go on forever in a finite world is either a madman or an economist.

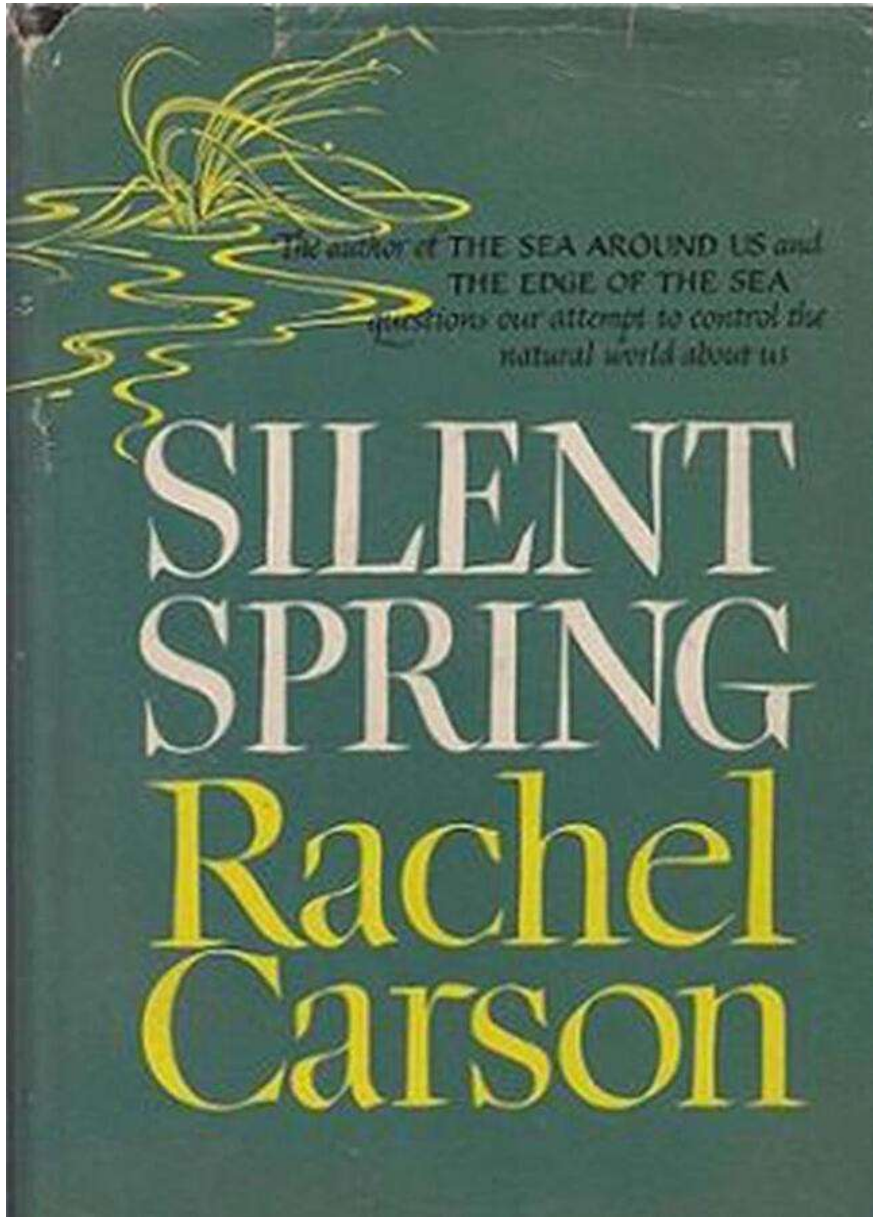
— *Kenneth E. Boulding* —

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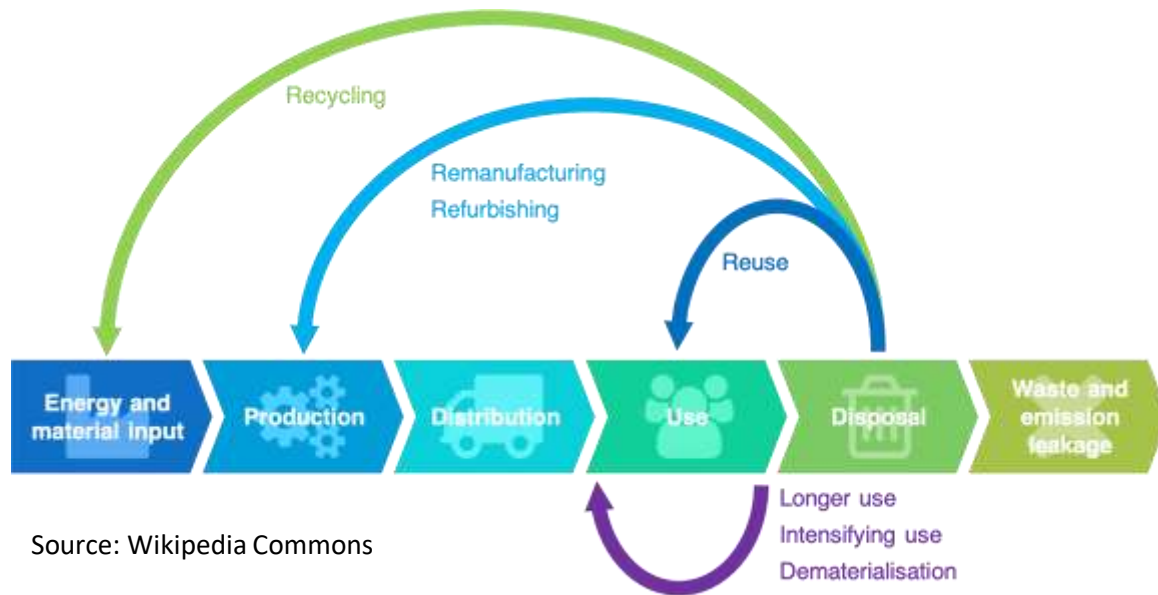
“How has the ecological world-view gone from a position of critical collision with economists’ denial of science and nature to subordinate collusion with neoliberal ‘solutions’, such as financial markets for carbon and ‘ecosystem services’, or techno-utopian geoengineering projects to make endangered ecosystems ‘resilient’ to planetary heating?”

How did we go from Rachel
Carson 1962 critique ...



“The ‘control of nature’
is a phrase conceived in
arrogance, born of the
Neanderthal age of
biology and philosophy,
when it was supposed
that nature exists for
the convenience of man”

... to science enrolled in alimentering the economy of promises



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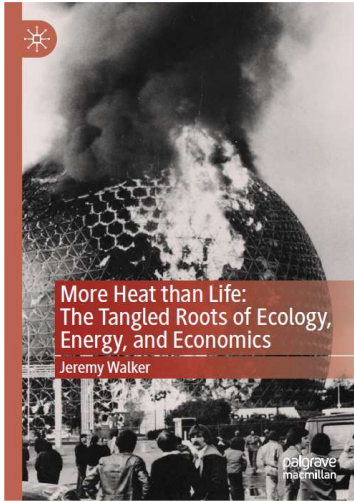
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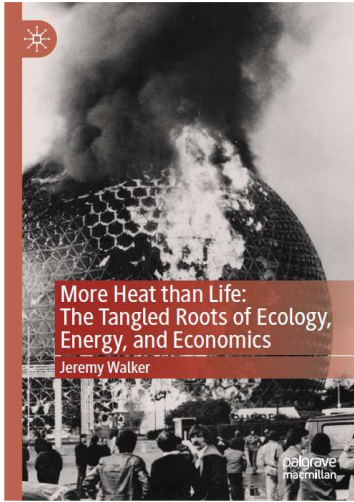


“The roots of our current condition might be traced to the crisis of American power of the early 1970s, a time when two bodies of knowledge—ecosystems ecology and the economics of the Chicago School—were transforming the institutions of the United States”

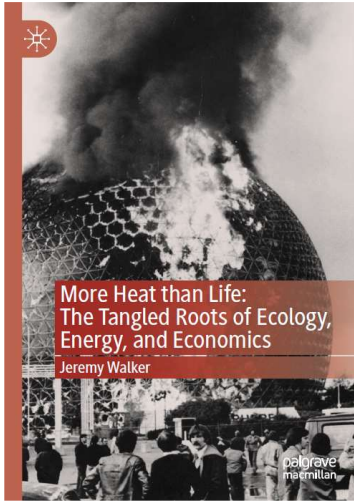
...

“both anchored their claims to the status of science in the energy physics developed by combustion engineers as the thermoindustrial revolution gathered momentum in the mid-nineteenth century”

οἶκος



“It was not until the 1970s, however, that ecology and economics were brought into direct ontological and political conflict...”



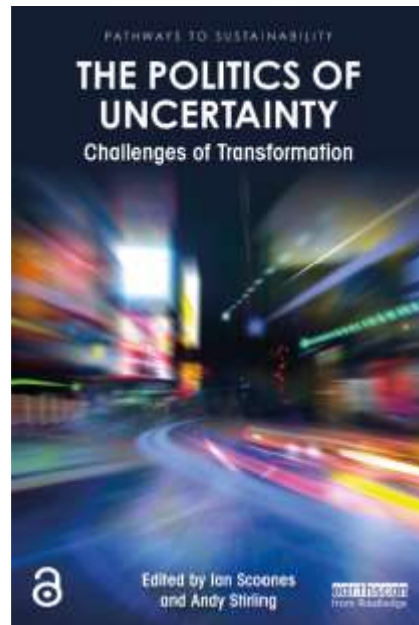
“how do we account for the uncritical commitment to infinite economic growth pursued by almost all nation-states, given the extensive empirical evidence that this is undermining the very habitability of the Earth?”

...

“The 2nd law of thermodynamics, despite being the most directly relevant principle of physics to our economic existence on Earth, has never been integrated into the canon of economic theory”

Why technocratic orthodoxy in EU institutions?

- The single market needs a centralized, hence standardized, risk assessment approach;
- EU has a generally pro-industry (e.g. biotech) growth agenda;
- Fear of opening the road to endless deconstruction of planned policies;
- A latent form of scientism subscribing to a vision of science's neutrality



4

THE UNRAVELLING OF TECHNOCRATIC ORTHODOXY?

Contemporary knowledge politics
in technology regulation

Patrick van Zwanenberg

Why don't we build in
silico a digital twin of
the earth to ease the
transition?

comment

Check for updates

A digital twin of Earth for the green transition

For its green transition, the EU plans to fund the development of digital twins of Earth. For these twins to be more than big data atlases, they must create a qualitatively new Earth system simulation and observation capability using a methodological framework responsible for exceptional advances in numerical weather prediction.

Peter Bauer, Bjorn Stevens and Wilco Hazeleger

The European Union (EU) intends to become climate neutral by 2050, and the set of policies designed to bring about this green transition — the European Green Deal — was announced in December 2019 (ref. 1). Accompanied by €1 trillion of planned investment, Green Deal policies aim to help the world's second-largest economy sustainably produce energy, develop carbon-neutral fuels and advance circular products in energy-intensive industrial sectors with zero waste and zero pollution.

A key element of the Green Deal is its dependence on the 'digital transformation' — an openly accessible and interoperable European dataspace as a central hub for informed decision making. The EU identified two landmark actions to support the necessary information systems: GreenData4All and Destination Earth'. Whereas GreenData4All will develop the European approach to discover, manage and exploit geospatial information, Destination Earth aims to construct highly accurate models, or 'digital twins', of the Earth to monitor and predict environmental change and human impact in support of sustainable development. Aligned with the new Digital Europe funding programme', Destination Earth is expected to start in 2021, and the first, high-priority digital twins serving extremes prediction and climate change adaptation will



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nature > nature reviews earth & environment > review articles > article

Review Article | Published: 02 May 2023

Big Data in Earth system science and progress towards a digital twin

Xin Li , Min Feng , Youhua Ran, Yang Su, Feng Liu, Chunlin Huang, Huanfeng Shen, Qing Xiao, Jianbin Su, Shiwei Yuan & Huadong Guo

Nature Reviews Earth & Environment 4, 319–332 (2023) | [Cite this article](#)

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Cornell University

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arXiv > physics > arXiv:2306.11175

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Submitted on 19 Jun 2023

Developing Digital Twins for Earth Systems: Purpose, Requisites, and Benefits

Yuhan Rao, Rob Redmon, Kirstine Dale, Sue E. Haupt, Aaron Hopkinson, Ann Bostrom, Sid Boukabara, Thomas Geenen, David M. Hall, Benjamin D. Smith, Dev Niyogi, V. Ramaswamy, Eric A. Kihn

The accelerated change in our planet due to human activities has led to grand societal challenges including health crises, intensified extreme weather events, food security, environmental injustice, etc. Digital twin systems combined with emerging technologies such as artificial intelligence and edge computing provide opportunities to support planning and decision-making to address these challenges. Digital twins for Earth systems (DT4ESs) are defined as the digital representation of the complex integrated Earth system including both natural processes and human activities. They have the potential to enable a diverse range of users to explore what-if scenarios across spatial and temporal scales to improve our understanding, prediction, mitigation, and adaptation to grand societal challenges. The 4th NOAA AI Workshop convened around 100 members who are developing or interested in participating in the development of DT4ES to discuss a shared community vision and path forward on fostering a future ecosystem of interoperable DT4ES. This paper summarizes the workshop discussions around DT4ES. We first defined the foundational features of a viable digital twins for Earth system that can be used to guide the development of various use cases of DT4ES. Finally, we made practical recommendations for the community on different aspects of collaboration in order to enable a future ecosystem of interoperable DT4ES, including equity-centered use case development, community-driven investigation of interoperability for DT4ES, trust-oriented co-development, and developing a community of practice.

Why don't we build in silico a digital twin of the earth?

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A digital twin of Earth for the green transition

[Peter Bauer](#) , [Bjorn Stevens](#) & [Wilco Hazeleger](#)

[Nature Climate Change](#) **11**, 80–83 (2021) | [Cite this article](#)

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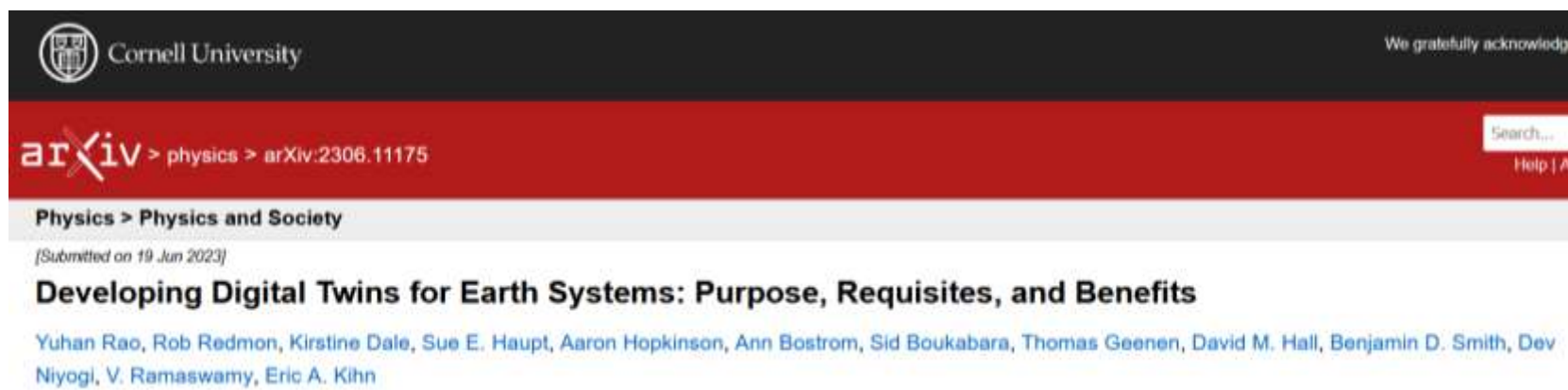
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Big Data in Earth system science and progress towards a digital twin

[Xin Li](#) , [Min Feng](#) , [Youhua Ran](#), [Yang Su](#), [Feng Liu](#), [Chunlin Huang](#), [Huanfeng Shen](#), [Qing Xiao](#), [Jianbin Su](#), [Shiwei Yuan](#) & [Huadong Guo](#)

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David Bower, Ryan Stevens & Wilco Hazeleger

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Shaping Europe's digital future

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Home > Policies > Destination Earth

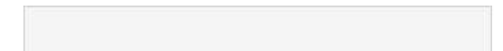
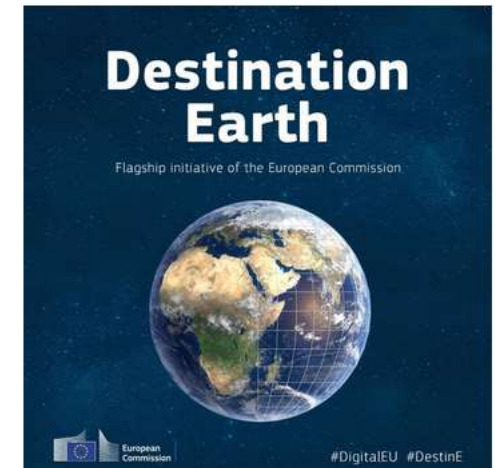
Destination Earth

Destination Earth (DestinE), a European Commission flagship initiative for a sustainable future

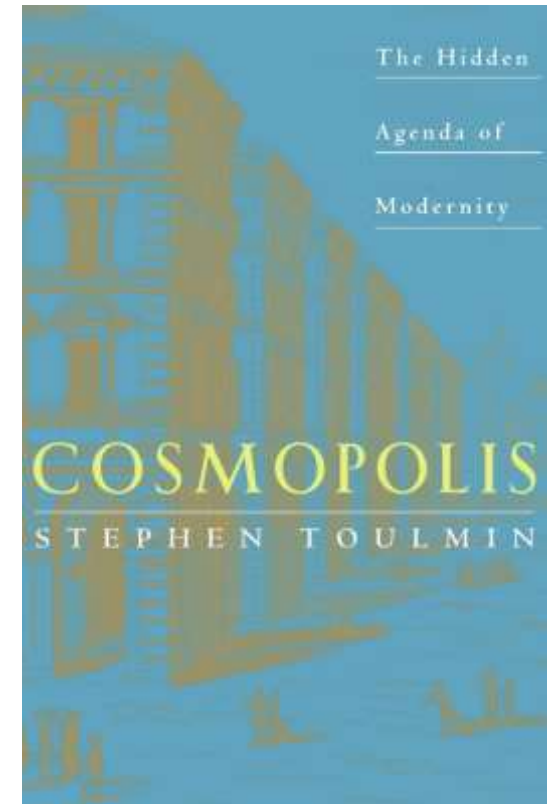
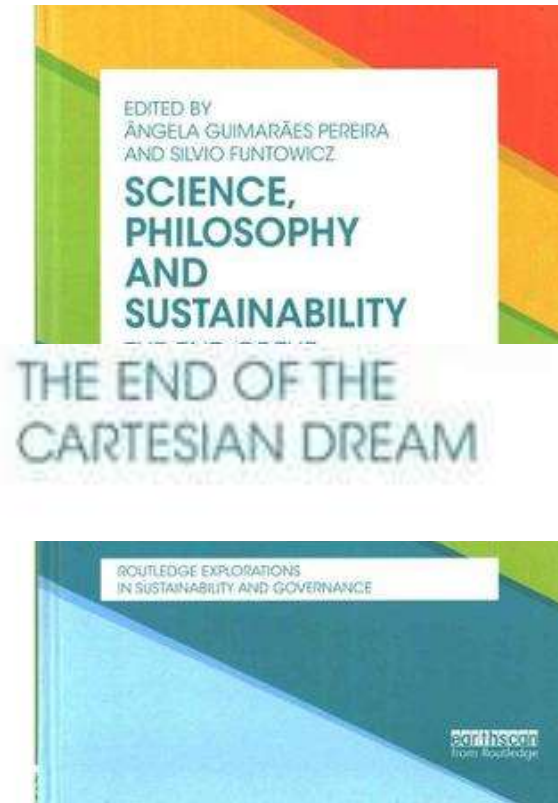
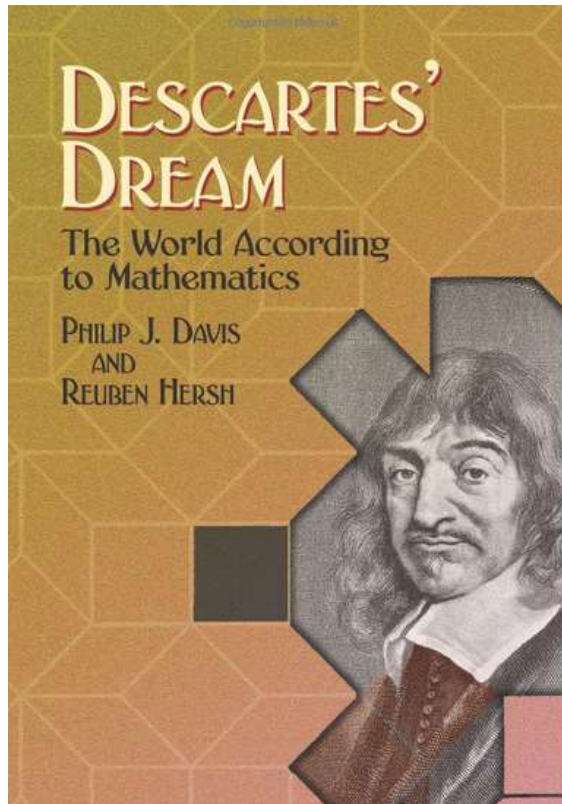
The Destination Earth (DestinE) is a flagship initiative of the European Commission to develop a highly accurate digital model of the Earth on a global scale. This model will monitor, simulate and predict the interaction between natural phenomena and human activities. It will contribute to achieving the objectives of the twin transition, green and digital as part of the European Commission's [Green Deal](#) and [Digital Strategy](#).

Destination Earth – new digital twin of the Earth will help tackle climate change and protect nature

In the EU: Destination Earth



Digital Twins of the Earth are a wrong metaphor
(the planet as a manufact; the ultimate Cartesian
Dream)



DT's wish to build general purpose machineries based on the belief that uses will be found for it; if it is true that "Financial markets and private companies, are in an "arms race" for climate intelligence" [1]. should this race be met with public funds?

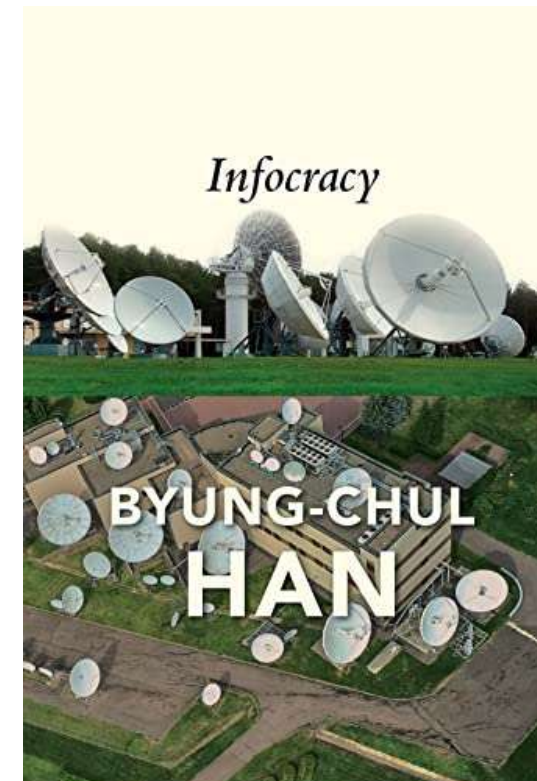
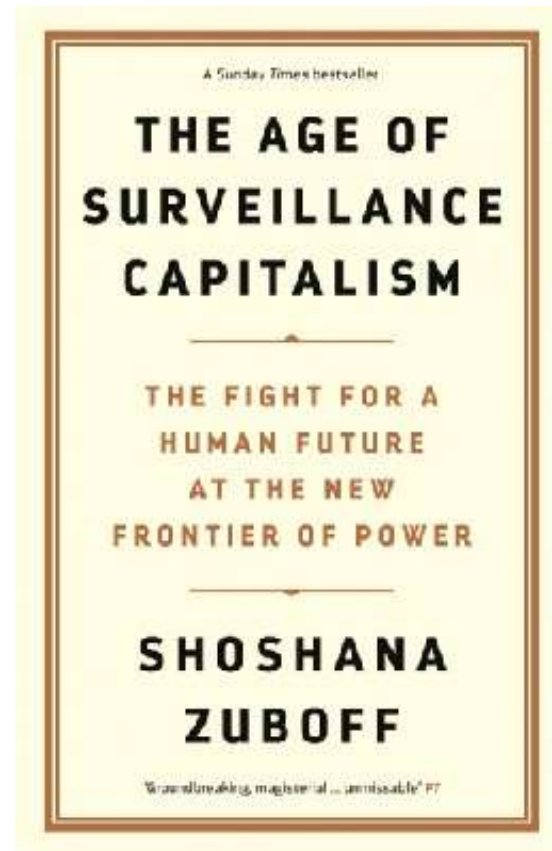
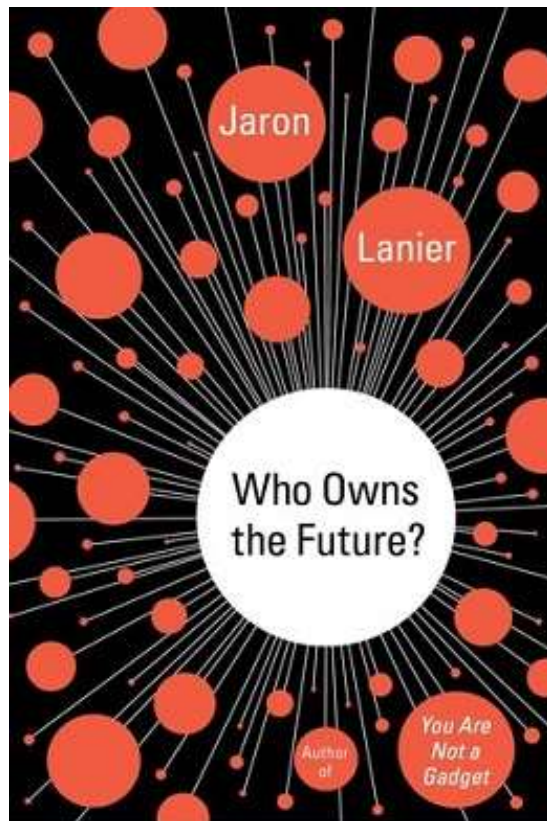
[1] L. Harris, "Rise of the Climate Rating Agencies," *The American Prospect*, Apr. 12, 2023. Accessed: Jun. 07, 2023. [Online]. Available: <https://prospect.org/api/content/6015e258-d87d-11ed-bd1d-12163087a831/>

DT's assume that climate change needs more evidence to promote political agency, and that said evidence can come in the form of DT's

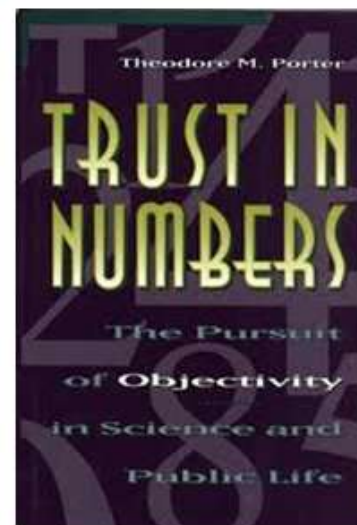
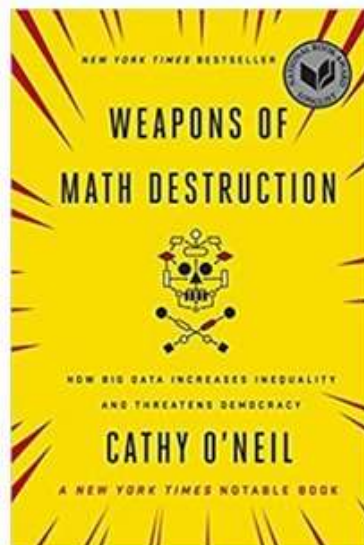
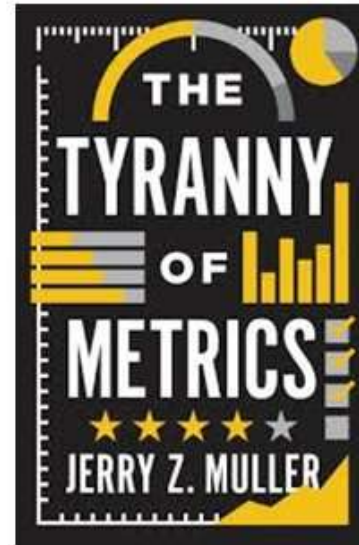
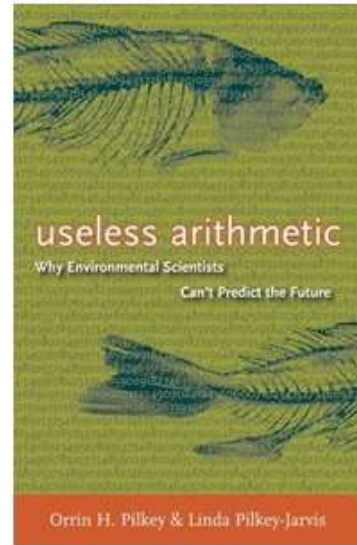
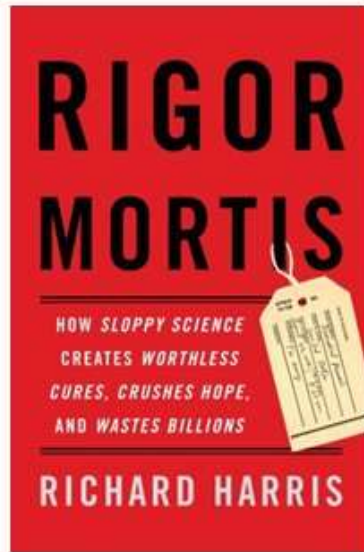
DT's invest resources to build a dubious future
“the current development cycle of global models is already at
least six years and it takes months to simulate the next century's
climate on supercomputer” while urgent work attends
us in the present

For DG DIGIT: Cyber security; Twitter/X and other critical
infrastructure; an open science that is not ‘captured’ by publishers, EU
lag in large language models technology in AI

The epistemic community around DT's unexposed to the concerns about the digitalization of the real



Algorithms, models, metrics, statistics...



Problems with DestinE

Calls on scarce resources; beware associated risks

Excessive faith in larger and larger models

COMMENT · 24 JUNE 2020

Five ways to ensure that models serve society: a manifesto

Pandemic politics highlight how predictions need to be transparent and humble to invite insight, not blame.

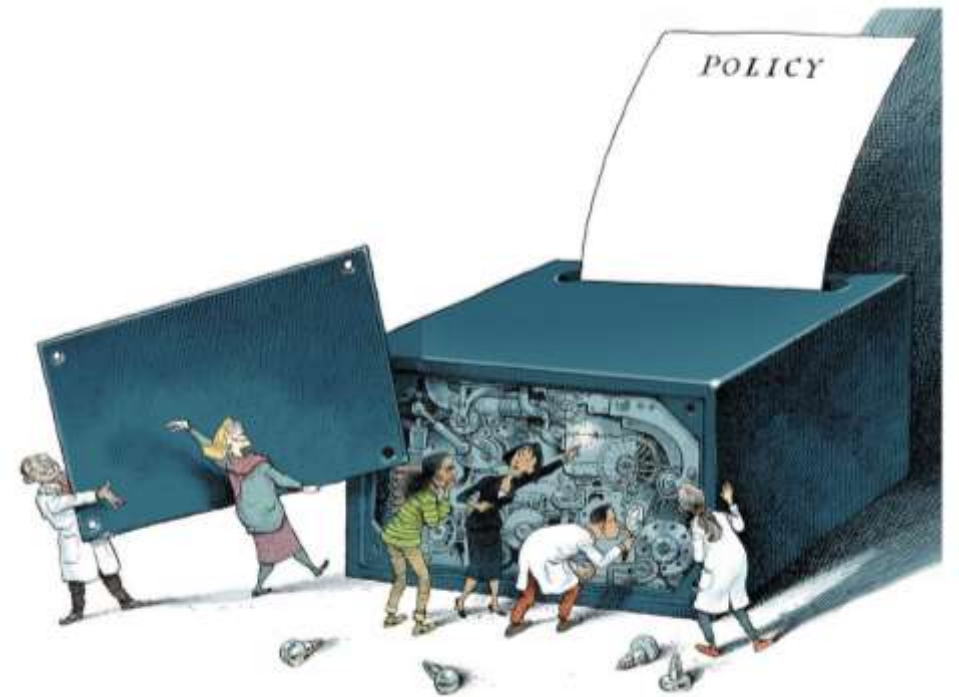


Illustration by David Parkins

Mind the assumptions

Assess uncertainty and sensitivity

Mind the hubris

Complexity can be the enemy of relevance

Mind the framing

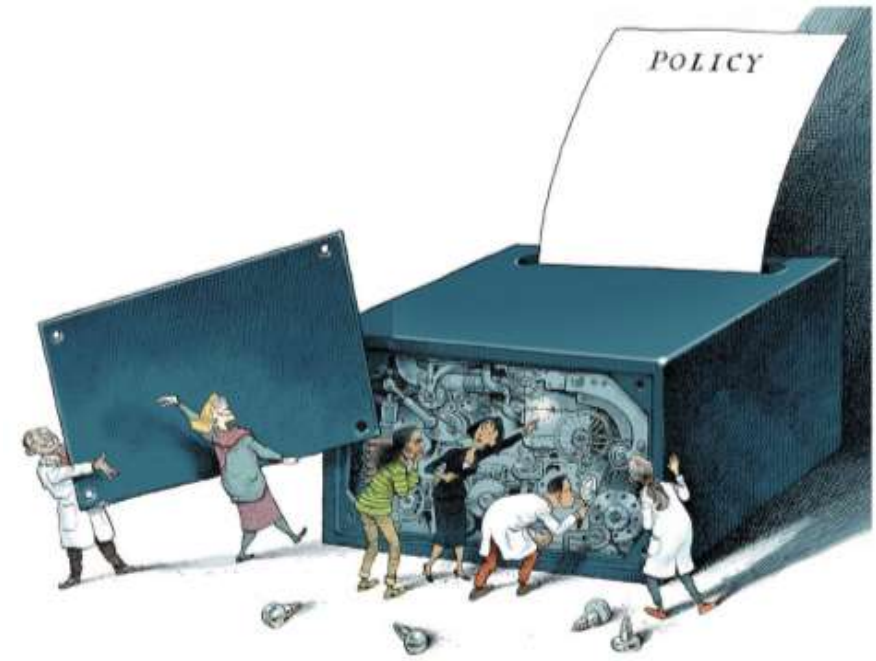
Match purpose and context

Mind the consequences

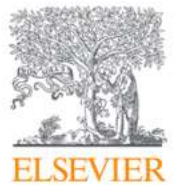
Quantification can backfire.

Mind the unknowns

Acknowledge ignorance



‘expected utility’, ‘decision theory’, ‘life cycle assessment’, ‘ecosystem services’ ‘sound scientific decisions’ and ‘evidence-based policy’ ... profusion of digits, promises of accuracy



Research Policy

Available online 21 December 2022, 104709

In Press, Corrected Proof 



Discussion

Against misleading technocratic precision in research evaluation and wider policy – A response to Franzoni and Stephan (2023), ‘uncertainty and risk-taking in science’

Andy Stirling 



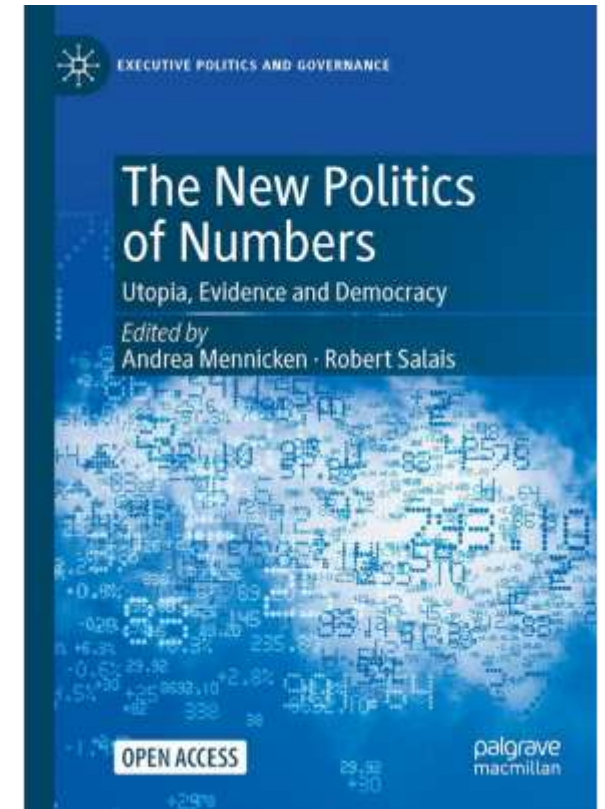
Andrew Stirling

Since the technique is never neutral a technical proof of quality is illusory without a parallel investigation of normative quality

Technical Quality

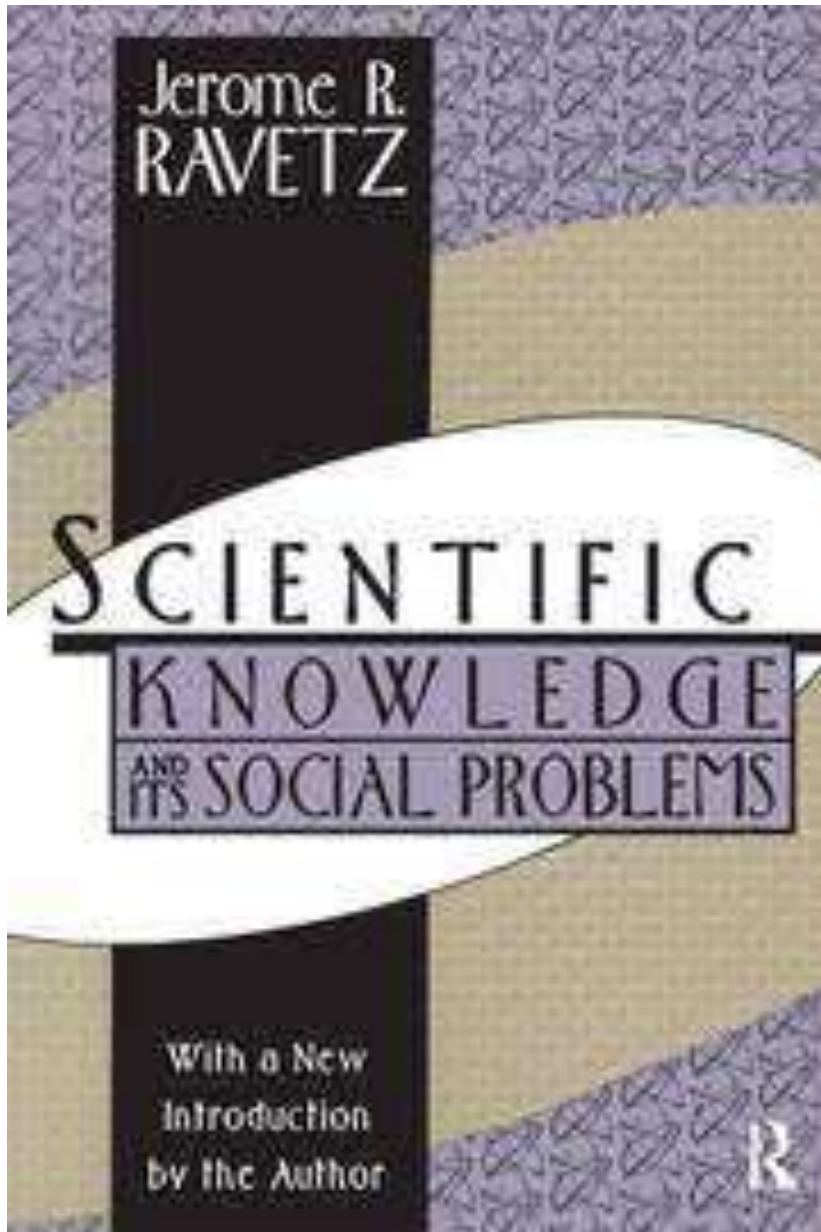
Normative quality

How the numbers of neoliberalism (New Public Management) constitute a regime of a-democracy; the example of indicators of employment

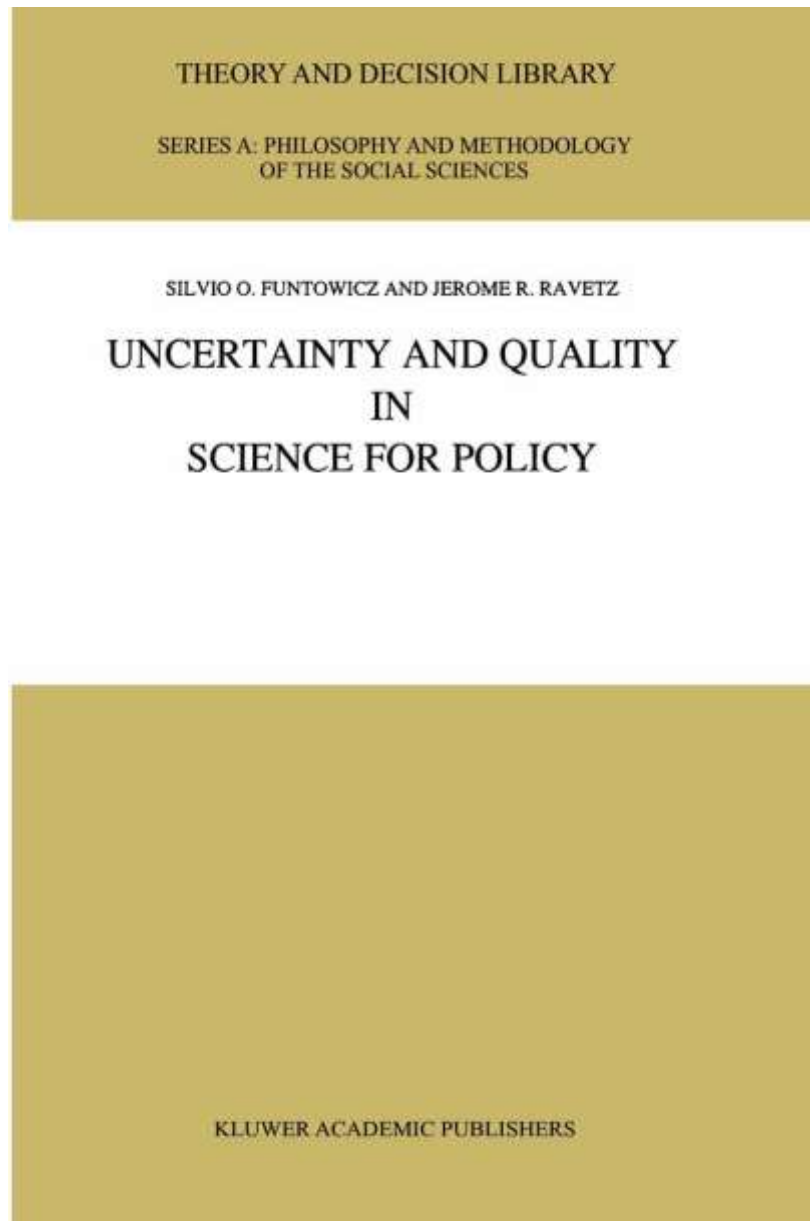


Salais, R. (2022). “La donnée n’est pas un donné”: Statistics, Quantification and Democratic Choice. In *The New Politics of Numbers: Utopia, Evidence and Democracy*, Andrea Mennicken and Robert Salais, Palgrave Macmillan, pp. 379–415.





1971



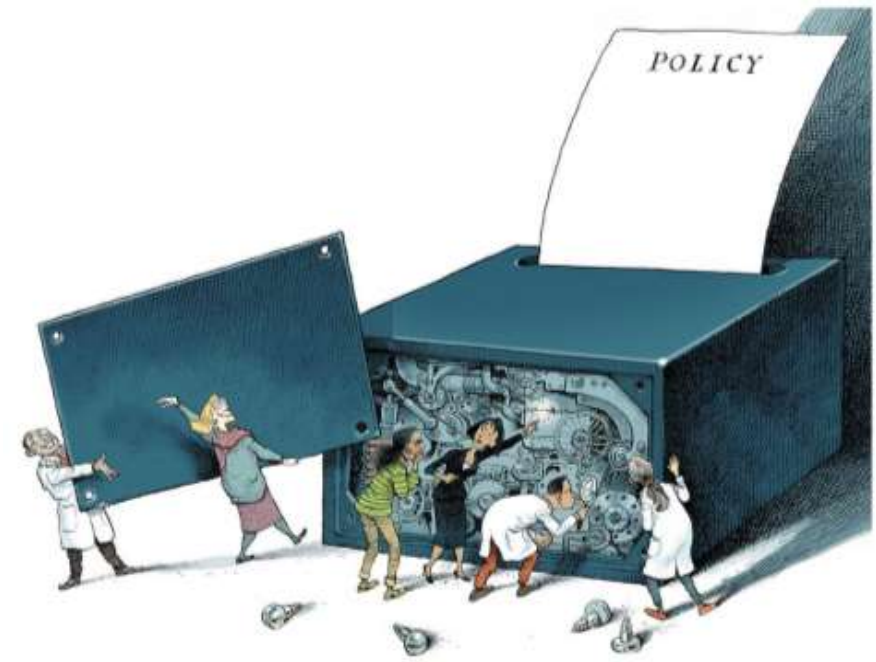
1990

Similar principles
in founding texts
of post-normal
science [3]

[3] Funtowicz, Silvio, and Jerome R. Ravetz. 1993. 'Science for the Post-Normal Age'. *Futures* 25(7):739–55. doi: 10.1016/0016-3287(93)90022-L.

Mind the consequences

Quantification can backfire.

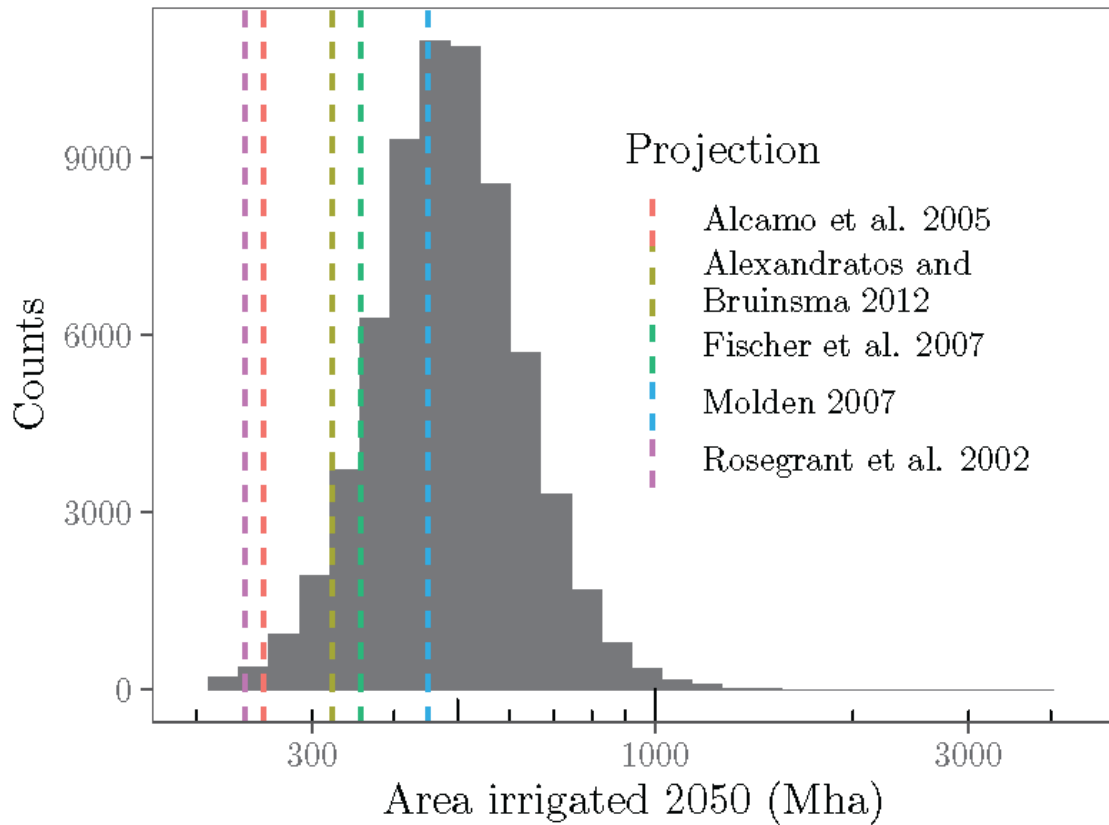


From the risk of financial products to irrigation to the models for disaster insurance bad modelling may lead to wrong decisions

SUPPLEMENTARY INFORMATION

1. Additional information and references

>260 references



**Current Models Underestimate
Future Irrigated Areas**

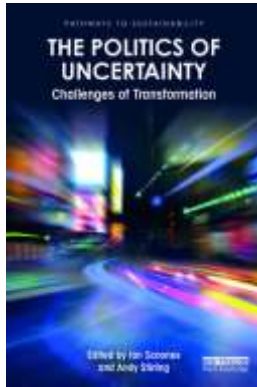
A. Puy, S. Lo Piano, A. Saltelli, 2020, Current models underestimate future irrigated areas, Geophysical Research Letters, Open access, Volume 47, Issue 8, doi.org/10.1029/2020GL087360.

3

SHARING RISKS OR PROLIFERATING UNCERTAINTIES?

Insurance, disaster and development

Leigh Johnson



Model-based parametric insurance led to dramatic consequences for developing countries experiencing draughts

Open access: <https://www.taylorfrancis.com/books/politics-uncertainty-ian-scoones-andy-stirling/e/10.4324/9781003023845>

Problems with digital twins and DestinE

The engagement of social science and humanities seems to be of a confirmatory nature – to help the actors of DestinE to get society onboard, [behavioural technologies]

(→ deficit model – the publics reject innovation because of scarce literacy)

Further disorientation in the hall of mirrors

[Brian Wynne](#)  [View all authors and affiliations](#)

[Volume 23, Issue 1](#) | <https://doi.org/10.1177/0963662513505397>

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Problems with digital twins: A-la-Zuckerberg approach to introducing new technologies: first it is done, then one worries about “How to embed the ethical, legal, and social considerations in the Digital Twin of the Earth and its interface (e.g. privacy, equity, accessibility ...)?”



A parallel with 2013 EC's Human Brain Project

“the European Commission awarded ... a staggering 1 billion euro grant ... the people I contacted struggled to name a major contribution that the HBP has made in the past decade” (Yong, 2019)

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Neuroscience: Where is the brain in the Human Brain Project?

[Yves Frégnac](#) ✉ & [Gilles Laurent](#) ✉

[Nature](#) 513, 27–29 (2014) | [Cite this article](#)

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The Atlantic

SCIENCE

The Human Brain Project Hasn't Lived Up to Its Promise

Ten years ago, a neuroscientist said that within a decade he could simulate a human brain. Spoiler: It didn't happen.

By Ed Yong JULY 22, 2019

Alternative voices; technologies of humility

- Winners and losers, voices to be heard from disciplines and societal actors

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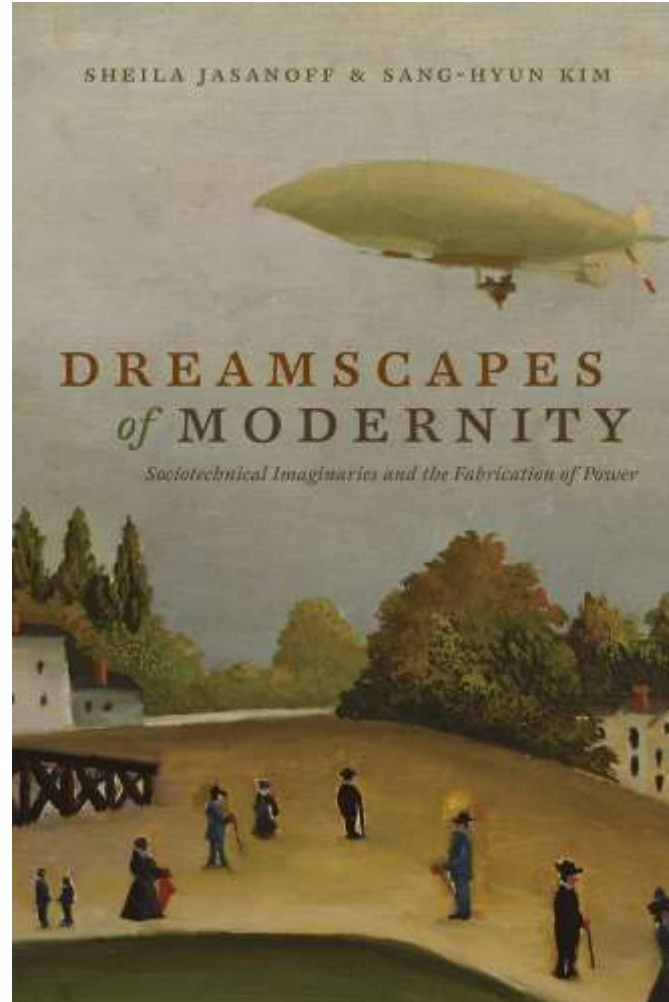
Sheila Jasanoff

Credits: D. Parkins

Sociotechnical imaginaries



Sheila Jasanoff



Alternative voices

- Alternatives framings, styles and methods (lenses: system ecology, non-Ricardian economics, feminist economics, post-normal science...)













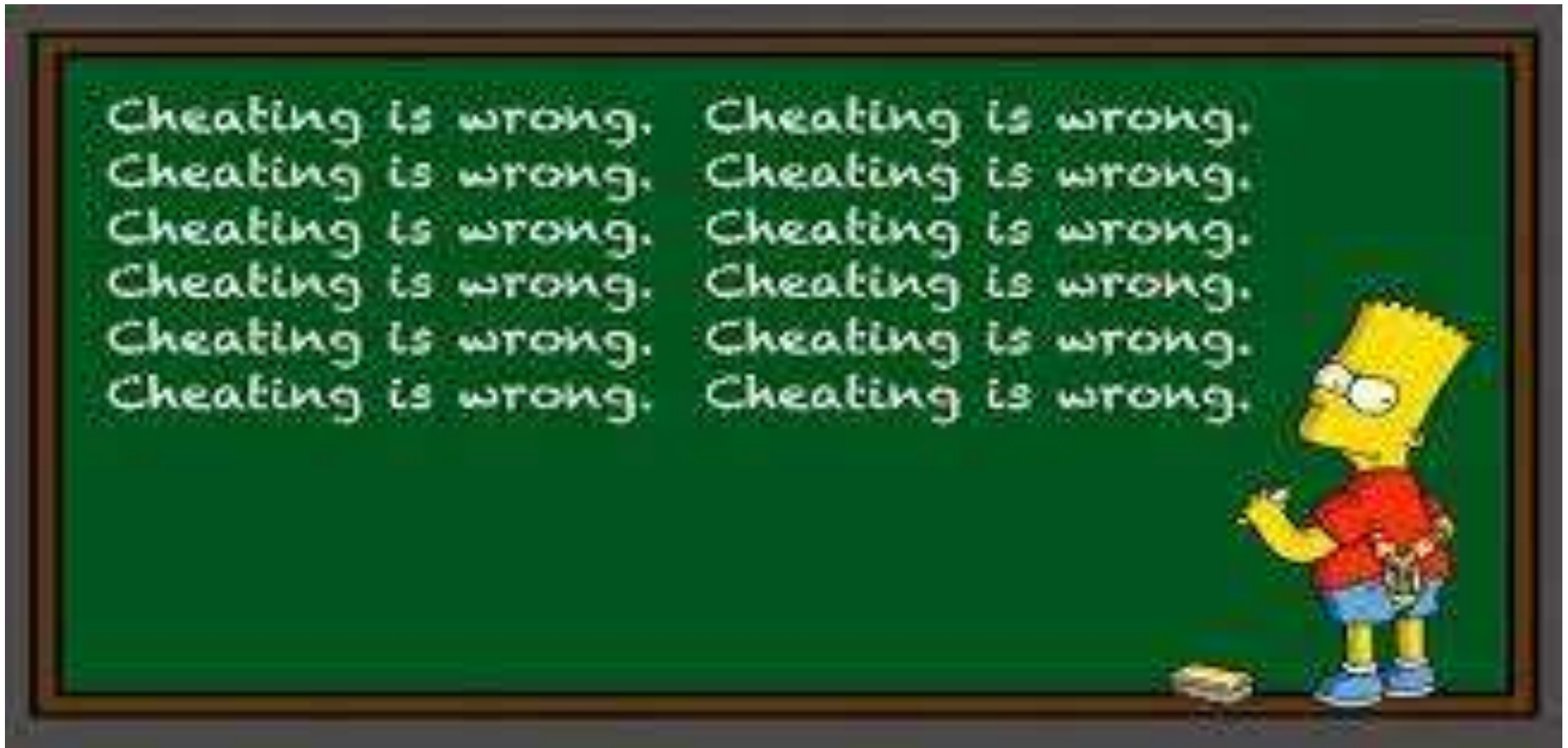
Environmental Science & Policy

Volume 142, April 2023, Pages 99-111



Impact assessment culture in the European Union. Time for something new?

[Andrea Saltelli](#)^{a b}  , [Marta Kuc-Czarnecka](#)^c , [Samuele Lo Piano](#)^d ,
[Máté János Lőrincz](#)^d , [Magdalena Olczyk](#)^c , [Arnald Puy](#)^e ,
[Erik Reinert](#)^{f g} , [Stefán Thor Smith](#)^d , [Jeroen P. van der Sluijs](#)^{b h} 



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