



Beware of green AI – Or what Big Tech likes to make of it

EcoCompute 13/11/2025

Dr. Anne Mollen

anne.mollen@uni-muenster.de

 [@AnMollen@chaos.social](https://chaos.social/@AnMollen)

Dr. Anne Mollen

- Postdoc researcher University of Münster, media and communication research
- B4: senior research associate AlgorithmWatch and project lead "SustAIIn: The sustainability index for Artificial Intelligence" (2020-2023)



What to expect?

„Sustainable“ extraction powered by AI

How Big Tech is corrupting Green AI

Distributional Justice and what to do about it

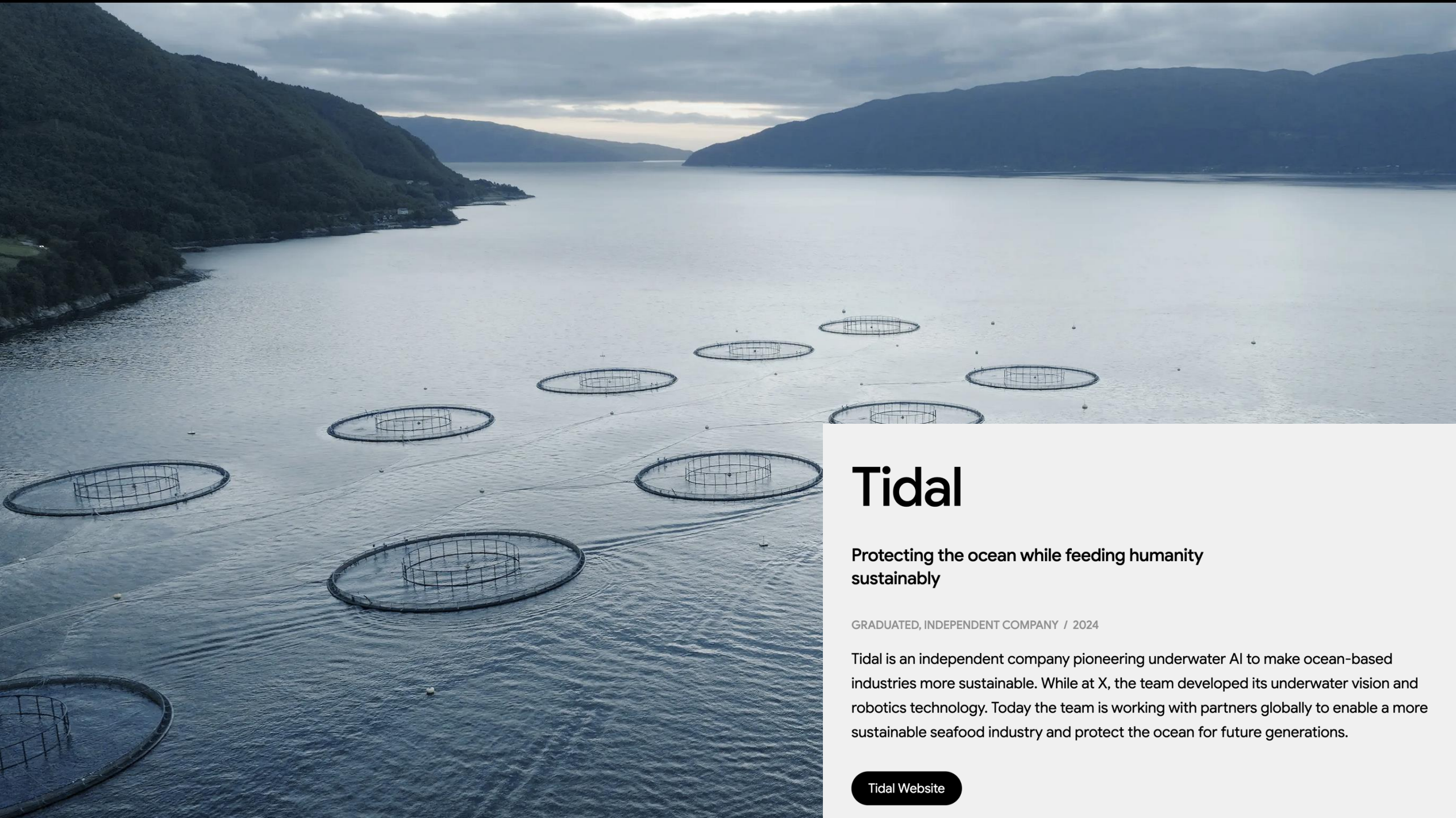
Sustainable extraction powered by AI?

Image taken from Brodie, Patrick (2026):
Aquaculture, AI, and the Planetary Domestication.
In: Mollen, Anne/Jansen, Fieke/Kannengießer,
Sigrid/Velkova, Julia: AI infrastructures and
sustainability. Palgrave Macmillan: London.



Filmless. (2024, March 17). *Google X: Tidal vision film* [Video]. YouTube. <https://www.youtube.com/watch?v=PsXw9SEKypQ>





Tidal

Protecting the ocean while feeding humanity sustainably

GRADUATED, INDEPENDENT COMPANY / 2024

Tidal is an independent company pioneering underwater AI to make ocean-based industries more sustainable. While at X, the team developed its underwater vision and robotics technology. Today the team is working with partners globally to enable a more sustainable seafood industry and protect the ocean for future generations.

[Tidal Website](#)

We estimate that global production declines 5.5×10^{14} kcal annually per 1 °C global mean surface temperature (GMST) rise (120 kcal per person per day or 4.4% of recommended consumption per 1 °C; $P < 0.001$).

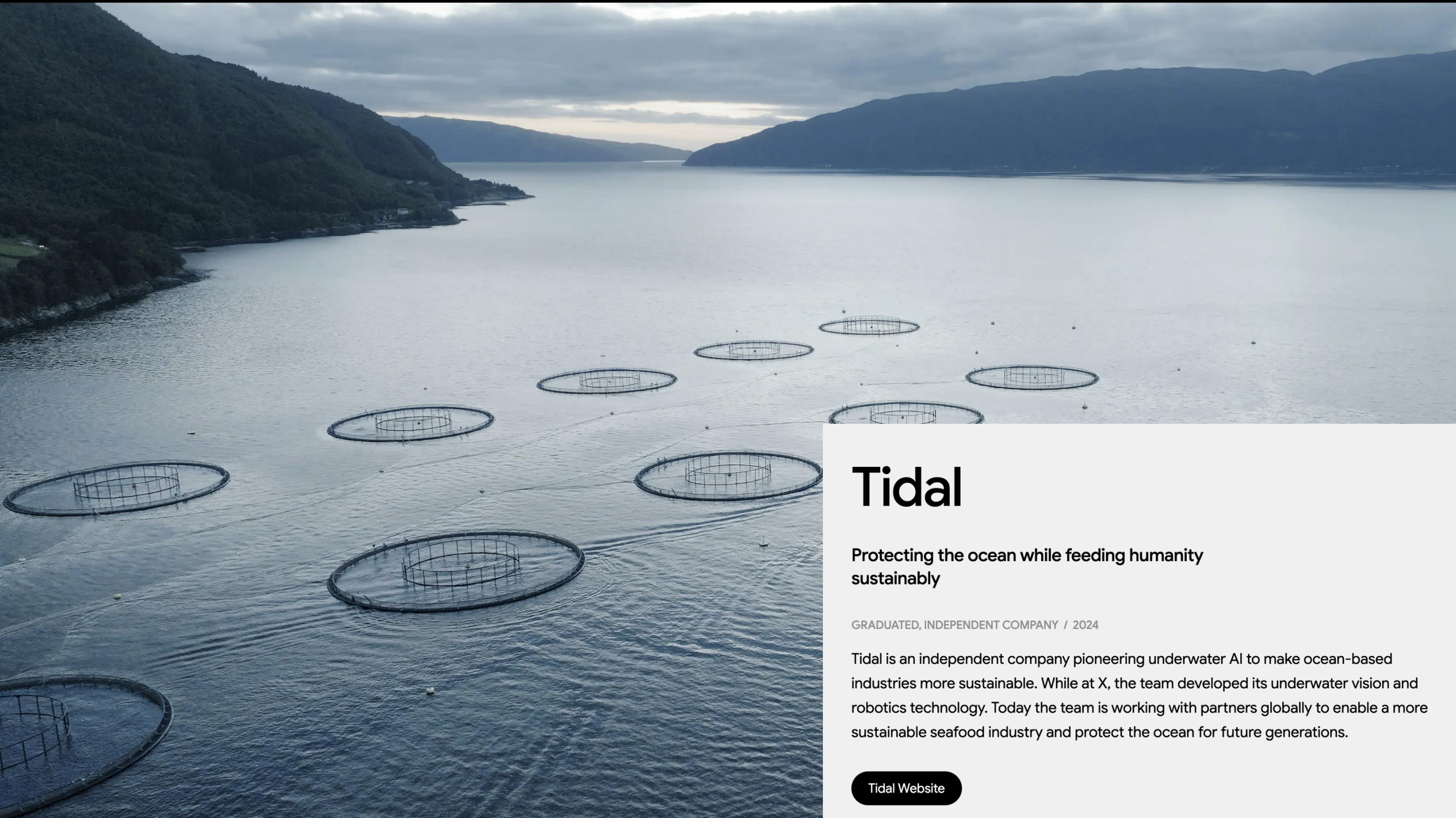
Impacts of climate change on global agriculture accounting for adaptation

[Andrew Hultgren](#) ✉, [Tamma Carleton](#), [Michael Delgado](#), [Diana R. Gergel](#), [Michael Greenstone](#), [Trevor Houser](#), [Solomon Hsiang](#) ✉, [Amir Jina](#), [Robert E. Kopp](#), [Steven B. Malevich](#), [Kelly E. McCusker](#), [Terin Meyer](#), [Johan Nath](#), [James Rivington](#), [Ashwin Rode](#) & [Jiacan Yuan](#)

[article](#)

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and systems¹, but the extent to which adaptation will be controversial². Even within the well-studied context of



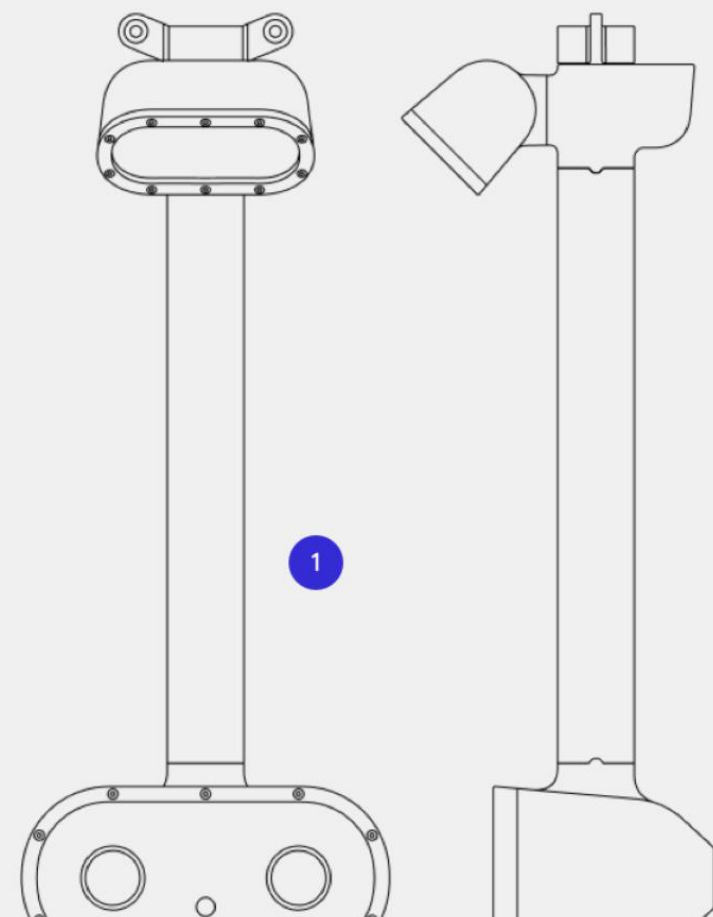
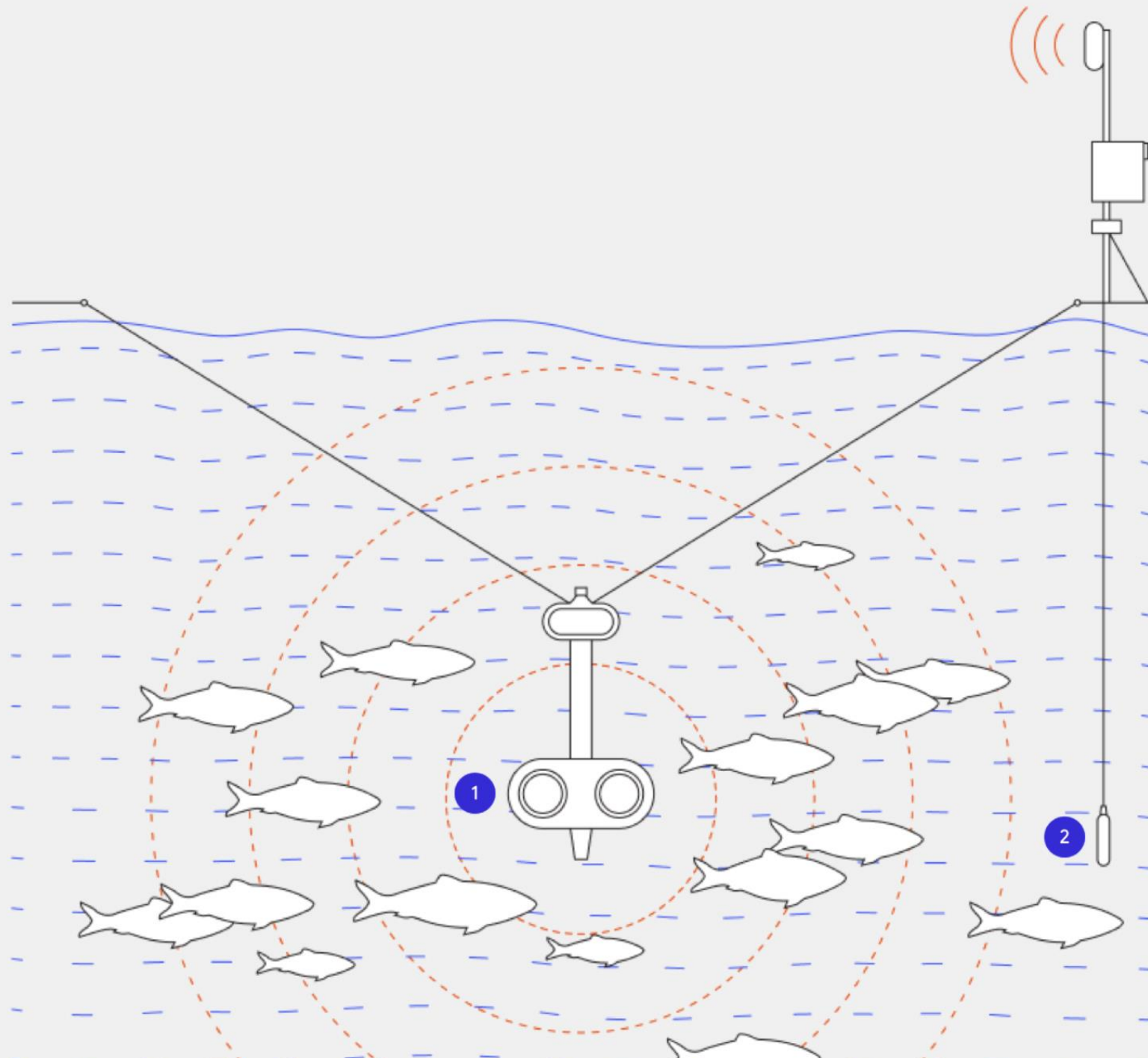
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[Tidal Website](#)



AI for sustainability

Green AI for sustainability

Big Tech is Corrupting Green AI

1. Green AI serves as an excuse to invest in more AI.
2. Green AI alludes that sustainability of AI is a technofix.
3. Green AI is used to narrow down understandings of sustainability.

Green AI serves as an excuse to invest in more AI.

What is Green AI?

Ressource efficiency of AI (Schwartz et al. 2019)

AI for sustainability

Sustainability as inter- and intragenerational justice

"development that meets the needs of the present without compromising the ability of future generations to meet their own needs"

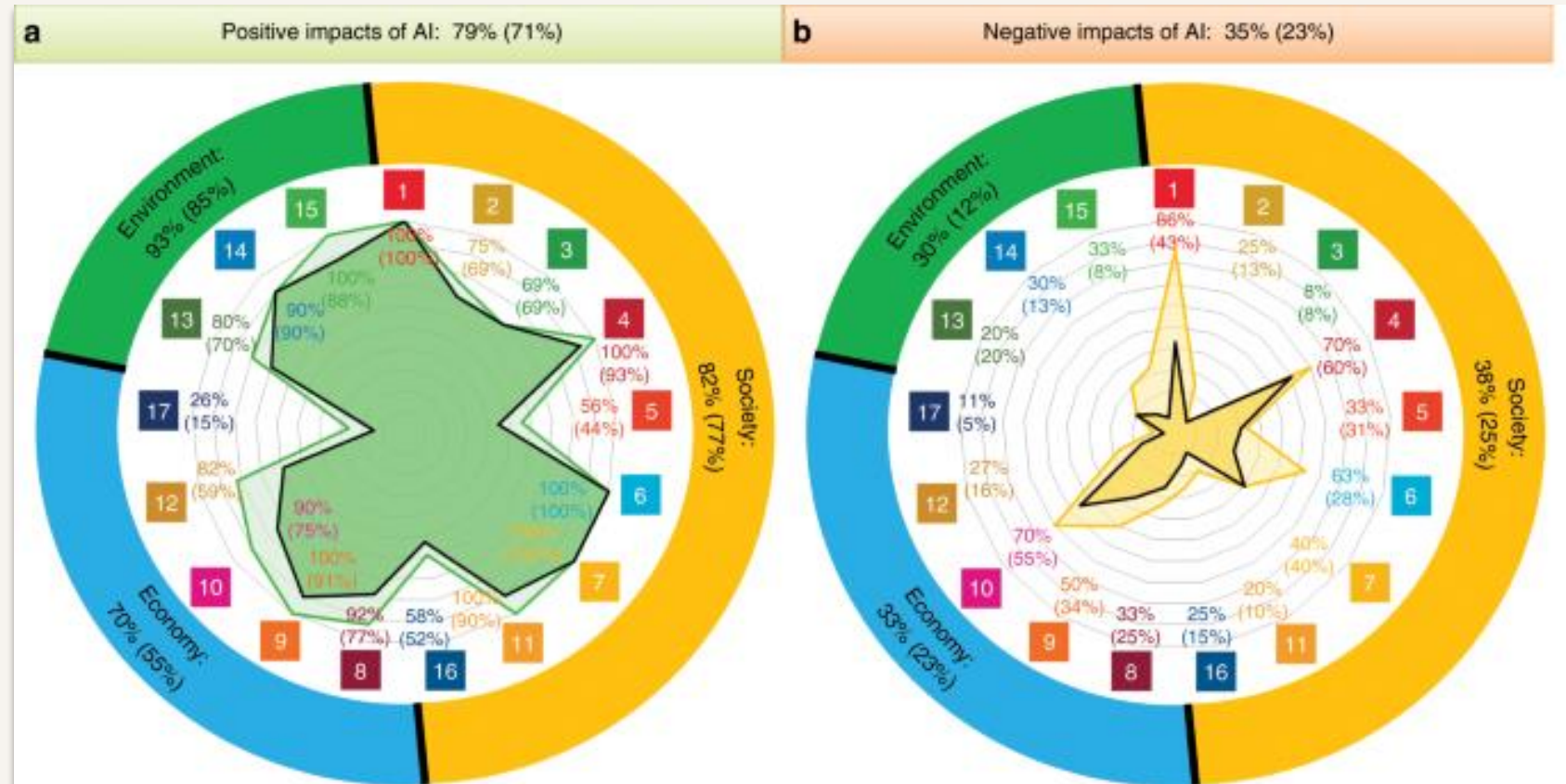
(United Nations, 1987, S. 37)

SUSTAINABLE DEVELOPMENT GOALS



AI and the SDGs

„we find that AI can enable the accomplishment of 134 targets across all the goals, but it may also inhibit 59 targets.“



Vinuesa, R., Azizpour, H., Leite, I. *et al.* The role of artificial intelligence in achieving the Sustainable Development Goals. *Nat Commun* **11**, 233 (2020). <https://doi.org/10.1038/s41467-019-14108-y>

		Causal inference	Computer vision	Interpretable models	NLP	RL & Control	Time-series analysis	Transfer learning	Uncertainty quantification	Unsupervised learning
1	Electricity systems									
	Enabling low-carbon electricity		•	•		•	•		•	•
	Reducing current-system impacts		•				•		•	•
	Ensuring global impact		•					•		•
2	Transportation									
	Reducing transport activity		•				•		•	•
	Improving vehicle efficiency		•			•				
	Alternative fuels & electrification					•				•
	Modal shift	•	•				•		•	
3	Buildings and cities									
	Optimizing buildings	•				•	•	•		
	Urban planning		•				•	•		•
	The future of cities				•		•	•		•
4	Industry									
	Optimizing supply chains		•			•	•			
	Improving materials									•
	Production & energy		•	•		•				
5	Farms & forests									
	Remote sensing of emissions		•							
	Precision agriculture		•			•	•			
	Monitoring peatlands		•							
	Managing forests		•			•	•			
6	Carbon dioxide removal									
	Direct air capture									•
	Sequestering CO ₂		•						•	•
7	Climate prediction									
	Uniting data, ML & climate science		•	•			•		•	
	Forecasting extreme events		•	•			•		•	
8	Societal impacts									
	Ecology		•					•		
	Infrastructure					•	•		•	
	Social systems		•				•			•
	Crisis		•		•					
9	Solar geoengineering									
	Understanding & improving aerosols						•		•	
	Engineering a planetary control system					•			•	
	Modeling impacts						•		•	
10	Individual action									
	Understanding personal footprint	•			•	•	•			
	Facilitating behavior change				•					•
11	Collective decisions									
	Modeling social interactions			•		•				
	Informing policy	•	•		•				•	•
	Designing markets					•	•			•
12	Education				•	•				
13	Finance				•	•			•	

Table 1: Climate change solution domains, corresponding to sections of this paper, matched with selected areas of ML that are relevant to each.

Examples: AI for Sustainability

- **Resource efficiency:** Energy supply, building and transport planning, predictive maintenance, smart farming, material optimization, etc.
- **Climate modeling:** Prediction of extreme events, analysis of climate data and climate forecasts
- **Circular economy:** Recycling of materials, identification and sorting of substances, etc.
- **Food security and health:** Efficiency and optimization in food production, AI-based diagnoses and early detection
- **Equality:** Early detection of domestic violence and calculation of recidivism rates for prisoners

Rolnick, D., Donti, P. L., Kaack, L. H., Kochanski, K., Lacoste, A., Sankaran, K., ... & Bengio, Y. (2019): Tackling climate change with machine learning. arXiv preprint arXiv:1906.05433.



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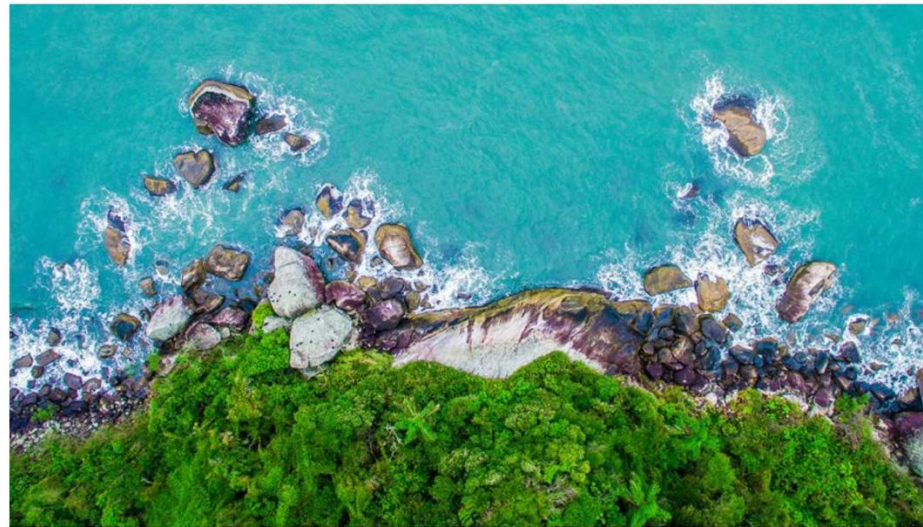
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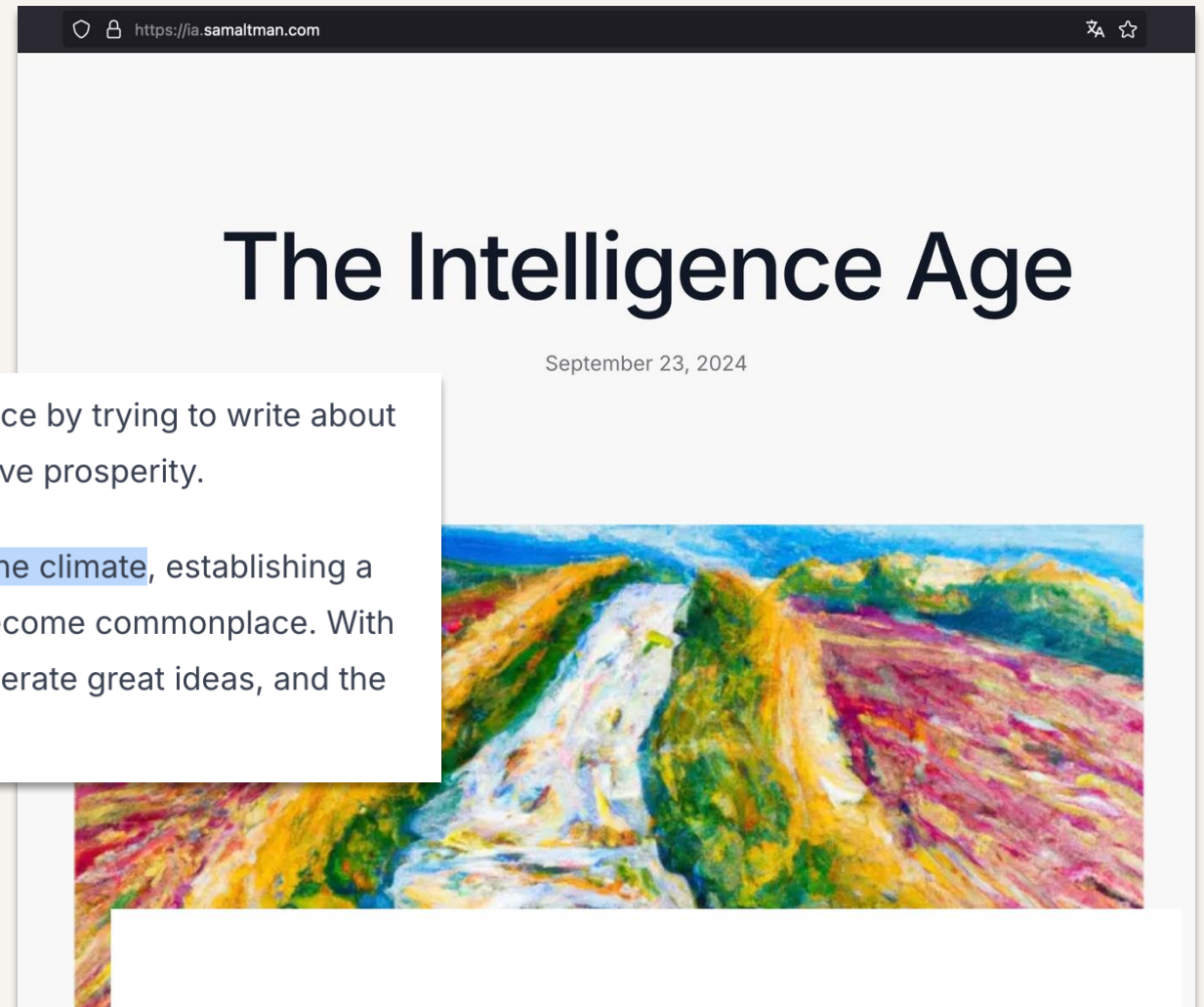


Artificial intelligence saving the natural world

Sam Altman, CEO Open AI

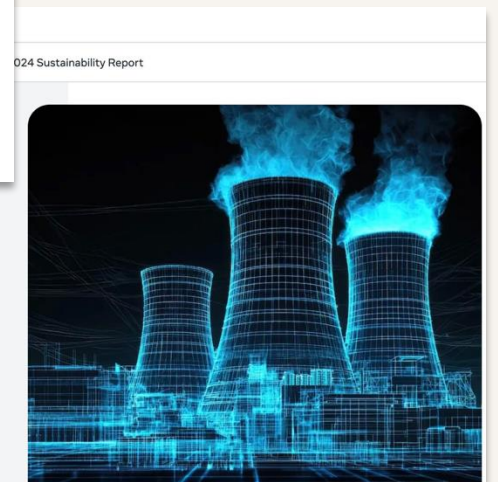
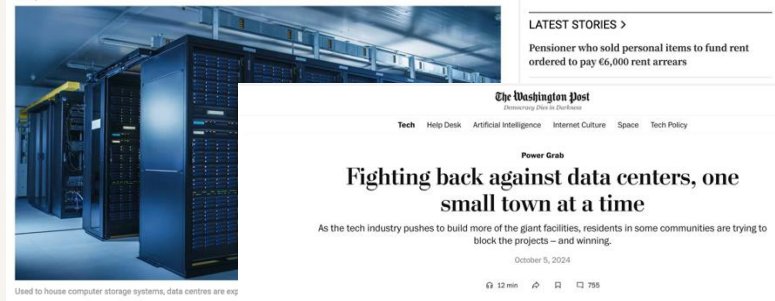
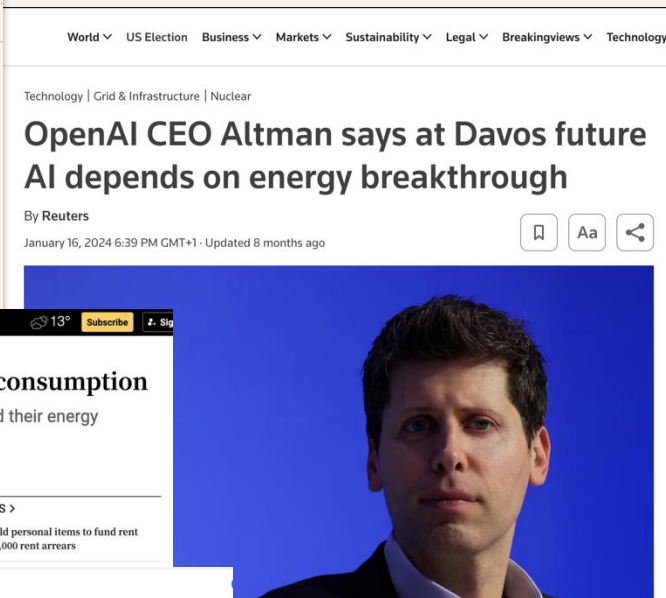
I believe the future is going to be so bright that no one can do it justice by trying to write about it now; a defining characteristic of the Intelligence Age will be massive prosperity.

Although it will happen incrementally, astounding triumphs – fixing the climate, establishing a space colony, and the discovery of all of physics – will eventually become commonplace. With nearly-limitless intelligence and abundant energy – the ability to generate great ideas, and the ability to make them happen – we can do quite a lot.



Market Power Energy Politics

Dr. Anne Mollen



Quellen:
<https://www.irishtimes.com/business/2024/07/23/electricity-consumption-by-data-centres-rises-to-21-eclipsing-urban-households>
<https://www.reuters.com/technology/openai-ceo-altman-says-davos-future-ai-depends-energy-breakthrough-2024-01-16/>
<https://sustainability.atmeta.com/blog/2024/12/03/accelerating-the-next-wave-of-nuclear-to-power-ai-innovation/>
<https://www.washingtonpost.com/technology/2024/10/05/data-center-protest-community-resistance/>



Green AI alludes that sustainability of AI is a technofix.

AI Technofixes?

AI provides technofixes for sustainability.

Sustainability of AI can be techno-fixed.

Kaack, L. H., Donti, P. L., Strubell, E., Kamiya, G., Creutzig, F., & Rolnick, D. (2022). Aligning artificial intelligence with climate change mitigation. *Nature Climate Change*, 12(6), 518–527. <https://doi.org/10.1038/s41558-022-01377-7>

„This will require a holistic portfolio of approaches (...) to incentivize uses of ML that support climate change strategies while mitigating the impacts of use cases that may counteract climate change goals.“

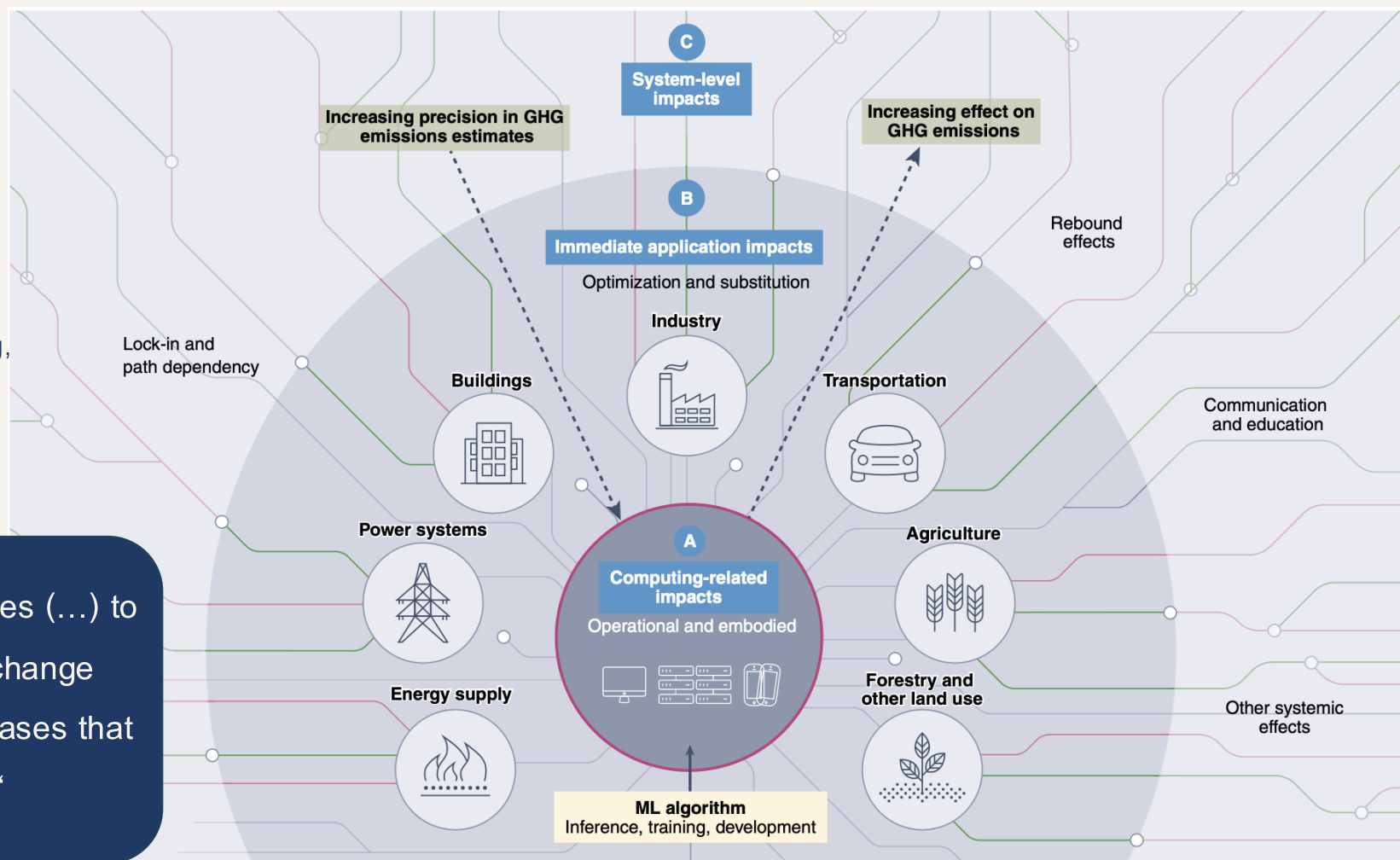


Fig. 1 | Framework for assessing the GHG emissions impacts of ML. We distinguish between three categories (A, B and C) with different kinds of potential emissions impacts, estimation uncertainties, and associated decarbonization levers. Green lines denote effects relating to reductions in GHG emissions, magenta lines relate to increases in emissions, and grey lines symbolize uncertain and/or negligible effects. We provide specifics of Category A of this framework in Fig. 2 and Category B in Fig. 3. Icons adapted with permission from the IEA.

SustAIIn:

The Sustainability Index for Artificial Intelligence



Set of Indicators along which to define and evaluate Sustainability of AI

Rohde et al. 2021: Nachhaltigkeitskriterien für künstliche Intelligenz. Schriftenreihe des IÖW, 220/21.

Nachhaltigkeit von KI bewertbar machen

Nachhaltige KI respektiert die planetaren Grenzen, verstärkt keine problematischen ökonomischen Dynamiken und gefährdet nicht den gesellschaftlichen Zusammenhalt. Im Projekt SustAIIn haben wir auf dieser Grundlage 13 Kriterien definiert, die Organisationen berücksichtigen sollten, um KI nachhaltiger zu produzieren und einzusetzen.



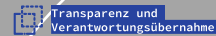
Sozial nachhaltige Entwicklung und Anwendung von Künstlicher Intelligenz stellt den Menschen, die Gesellschaft und gerechte Lebensverhältnisse in den Mittelpunkt. Damit Menschen ein würdiges Leben führen können, müssen grundlegende Bedürfnisse wie die Nahrungsversorgung oder ein ausreichender Wohnraum erfüllt sein. Zugleich müssen sie Zugang zu Infrastrukturen wie Strom, Wasser oder zum Internet haben. Eine sozial nachhaltige Gesellschaft erlaubt es den Menschen, sich frei zu entfalten. Dem Befähigungsansatz des Ökonomie-Nobelpreisträgers Amartya Sen und der Moralphilosophin Martha Nussbaum zufolge muss eine nachhaltige gesellschaftliche Entwicklung den Menschen Entwicklungschancen bieten. Sie müssen auf ein Fundament von materiellen und kulturellen Handlungsressourcen zurückgreifen können, um ihre Rechte wahrzunehmen.



Auch KI-Systeme müssen die Würde des Menschen wahren. Sie dürfen niemanden ausschließen, benachteiligen oder diskriminieren und die menschliche Autonomie und Handlungsw

Praxisbeispiele für die Nachhaltigkeitskriterien? Achten Sie auf die Infoboxen im gesamten Magazin.

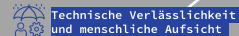
freiheit nicht einschränken. Werte wie Gerechtigkeit, Inklusion oder Freiheit müssen im Design, bei der Entwicklung und in der Anwendung von KI einbezogen werden. Insbesondere sollte auch die Fähigkeit, auf menschliche Art und Weise zu denken, zu argumentieren und zu handeln, nicht durch die Systeme eingeschränkt werden.



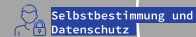
Wer KI nutzt oder mit ihr interagiert, sollte vorab darüber informiert worden sein, dass KI eingesetzt wird, und die daraus hervorgehenden Ergebnisse nachvollziehen können. Hierzu müssen zentrale Informationen zu KI-Systemen offengelegt werden und Verantwortlichkeiten für deren Ergebnisse geklärt sein.



Bei der KI-Entwicklung und -Anwendung sollte ein Bewusstsein für Fairness vorhanden sein. Außerdem sollte die KI regelmäßig auf mögliche Diskriminierungen hin überprüft werden.



Schwachstellen in KI-Systemen sollten systematisch über Risikobewertungen identifiziert werden. Zudem sollte eine hohe Datenqualität sichergestellt sein. Systemeingriffe durch Menschen sollten ermöglicht werden.



Kleine Datensätze, Verschlüsselung oder ein Widerspruchsrecht bei der Verwendung personenbezogener Daten stärken neben weiteren Maßnahmen die informationelle Selbstbestimmung und den Datenschutz.

Ecological Sustainability

- Energy Consumption
- CO2 Emissions
- Sustainability potentials in use and application
- Indirect Resource Consumption

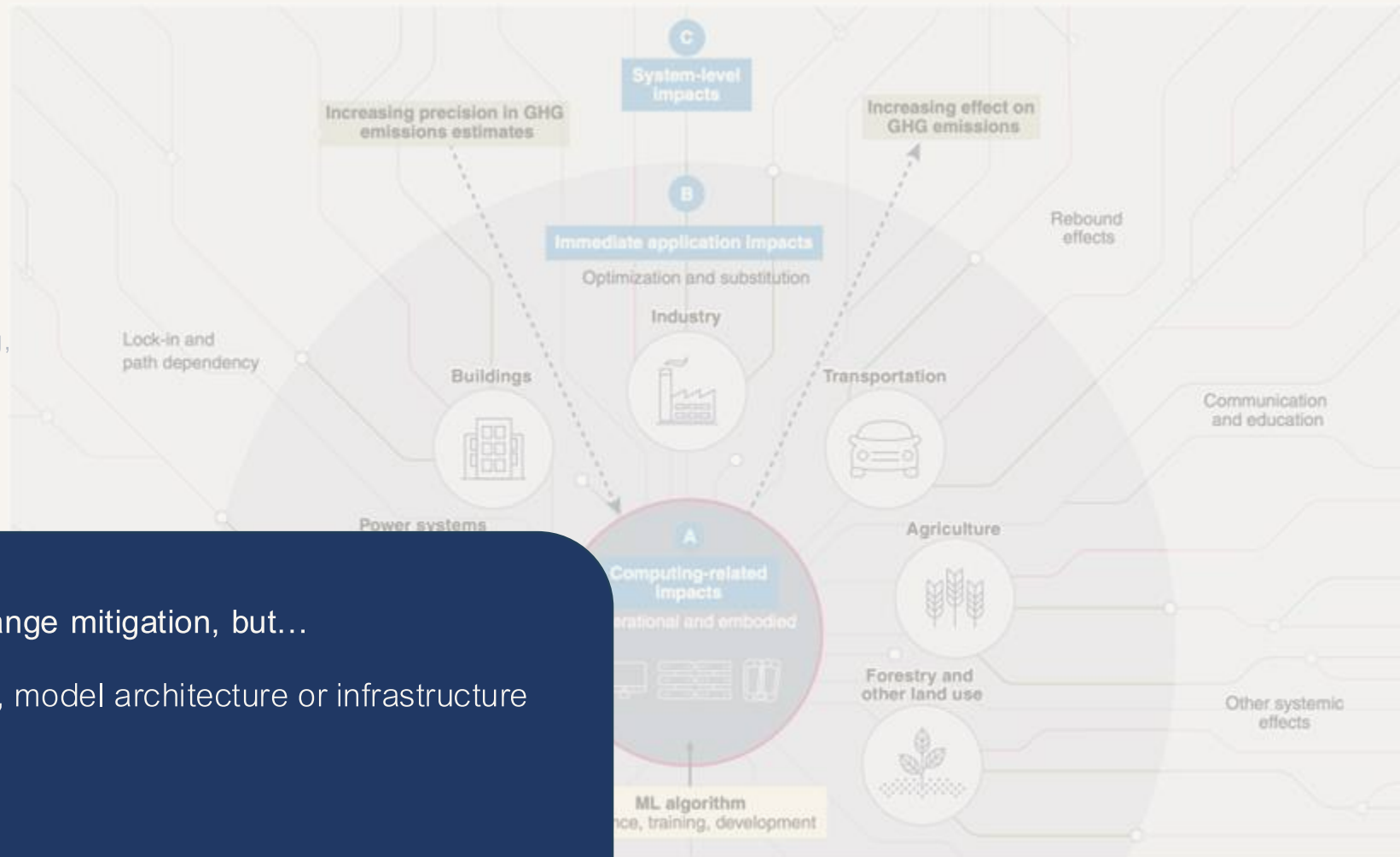
Social Sustainability

- Transparency & Accountability
- Non-discrimination & Fairness
- Self-Determination & Data Protection
- Technical Reliability & Human Oversight
- Co-Design and Participatory Design
- Cultural Appropriateness

Economic Sustainability

- Market Diversity & Unlocking of Innovation Potential
- Distribution Effects in Target Markets
- Working Conditions & Jobs

Kaack, L. H., Donti, P. L., Strubell, E., Kamiya, G., Creutzig, F., & Rolnick, D. (2022). Aligning artificial intelligence with climate change mitigation. *Nature Climate Change*, 12(6), 518–527. <https://doi.org/10.1038/s41558-022-01377-7>



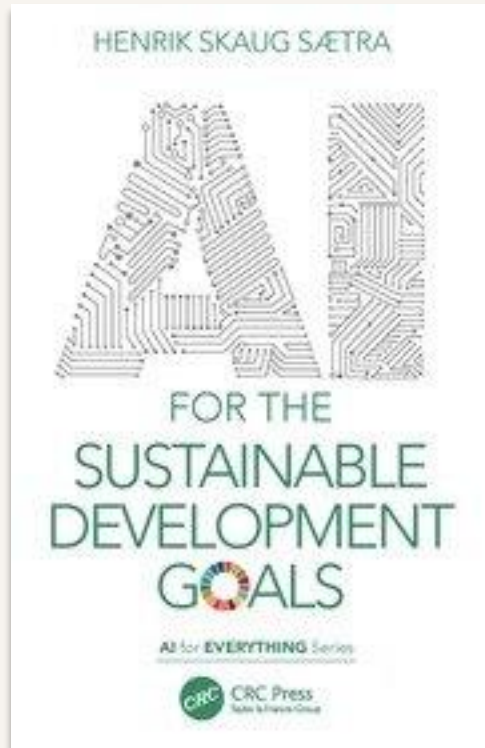
... We distinguish between three categories (A, B and C) with different kinds of potential carbonization levers. Green lines denote effects relating to reductions in GHG emissions, while grey lines symbolize uncertain and/or negligible effects. We provide specifics of Category A of this framework in Fig. 2 and Category B in Fig. 3. Icons adapted with permission from the IEA.

Green AI might help aligning AI with climate change mitigation, but...

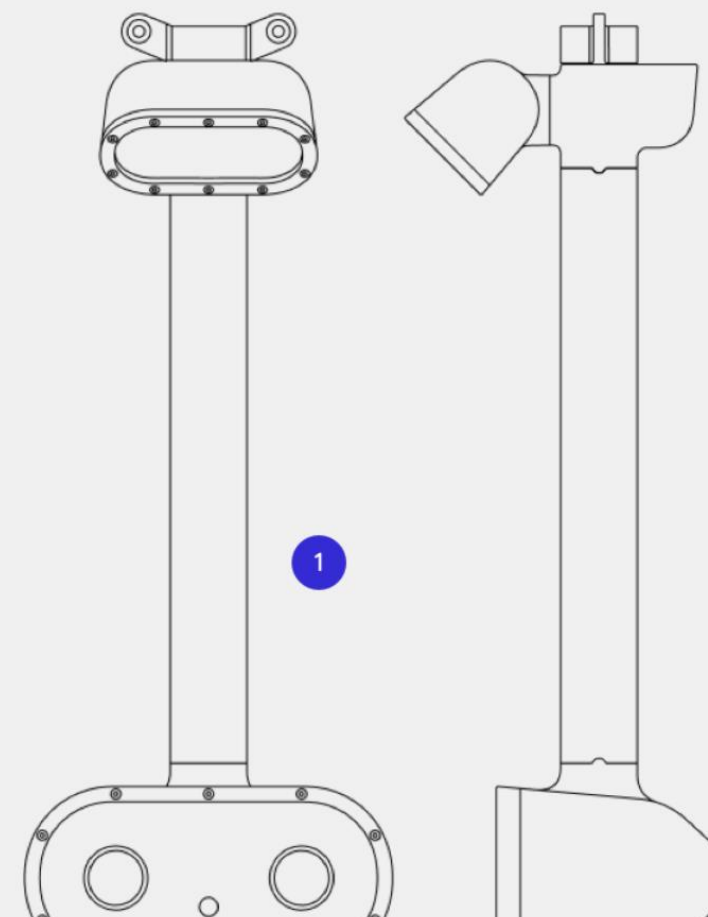
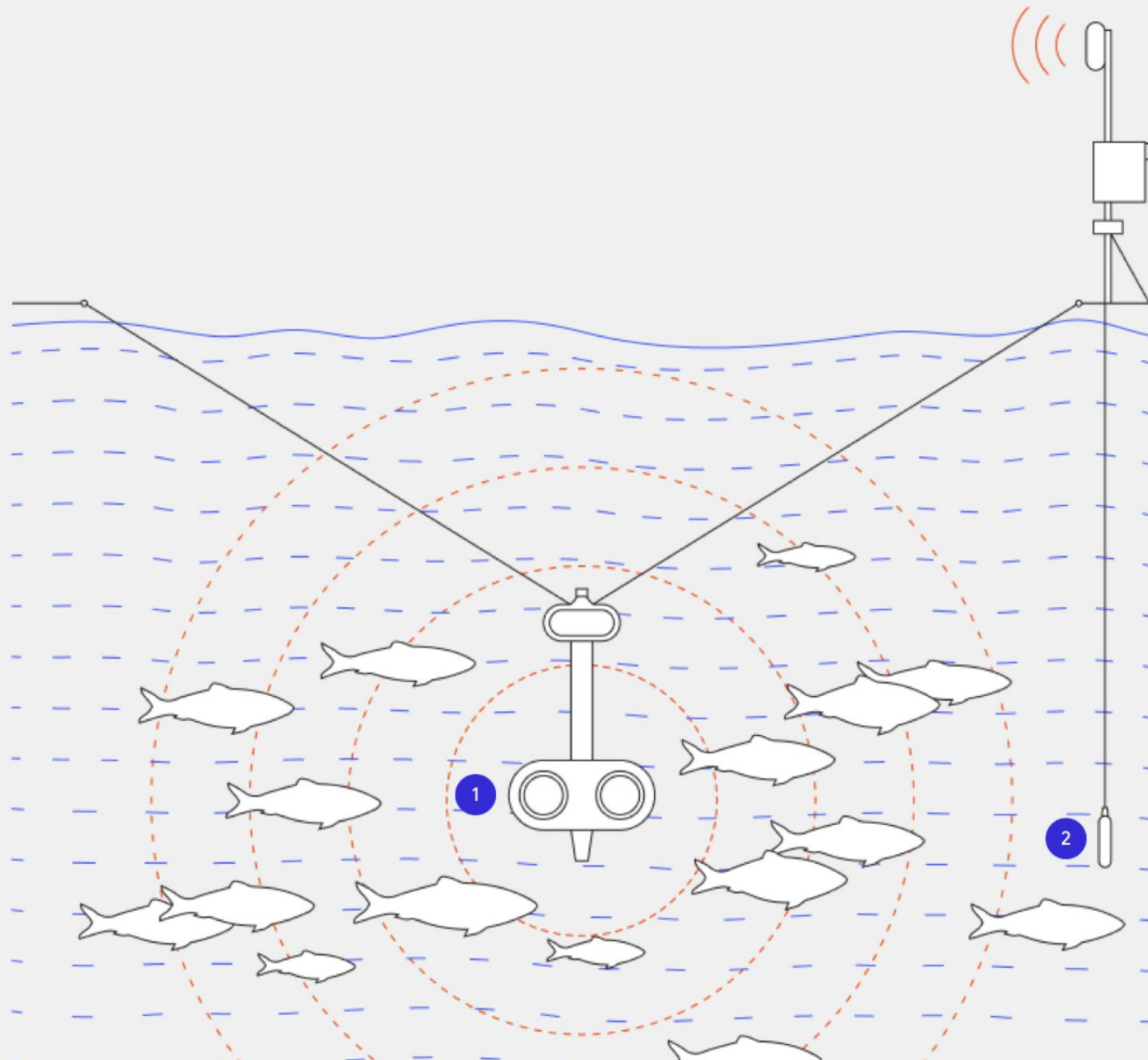
- Sustainability of AI is not solved in data sets, model architecture or infrastructure
- Quantification of AI impacts is flawed
- Gross-net calculations are impossible
- Theoretical potentials do not match realistic potentials

AI beyond technofixes

Sætra: „Take a look at the SDG 8, which is economic growth. A lot of people in the tech sector are saying: “The data economy is built on us, we further economic growth”. **But SDG 8 actually says that this growth should be inclusive and sustainable.** So it should be beneficial also for those most in need. It’s redistributive in a sense that all the justice-related aspects of economic growth must be there. As such, real contribution to SDG 8 can have positive impacts almost all across the board. And the other around way: if you create more unsustainable and *uninclusive* economic growth that promotes concentration of wealth among very few people or corporations, then it will have negative ripple effects on almost all the other goals as well.“



Green AI is used to narrow down understandings of sustainability.



AI for sustainability

Emissions management

Energy management

ESG data management



AI:
r advancing



Blog

3 ways AI is helping the planet

Microsoft is working to make datacenters and AI systems more energy and water efficient. We are also using carbon-free energy and enhancing access.

> Read the blog



Blog

Simplify CSRD reporting with AI

Learn how sustainability data solutions in Microsoft Fabric can help you meet reporting needs.

> Read the blog



Documentation

Discover intelligent insights

Learn how to use AI-generated intelligent insights in Microsoft Sustainability Manager.

> Learn more

A Planetary Computer for a Sustainable Future



**Supporting sustainability decision-making
with the power of the cloud**

The Planetary Computer combines a multi-petabyte catalog of global environmental data with intuitive APIs, a flexible scientific environment that allows users to answer global questions about that data, and applications that put those answers in the hands of conservation stakeholders.

"And that's why we need solutions like artificial intelligence that are capable of being deployed at a **planetary scale**. ... at its core, AI is just an algorithm that solves for an objective function. It solves a problem.

And the **biggest problem** we need to solve right now is how we, as humans, **can continue to grow and prosper** without destroying the very ecosystems that we all depend on."

(Microsoft Chief Environmental Officer, 2019)

🏠

>

AROUND THE GLOBE

>

GOOGLE IN EUROPE

The AI opportunity for Europe’s climate goals

Apr 08, 2025

2 min read

AI policy recommendations to support EU climate and competitiveness goals.



Annette Kroeber-Riel

Vice President, Government Affairs and Public Policy for Europe

🔗

Share



AI as a solution to sustainability narrowed down to

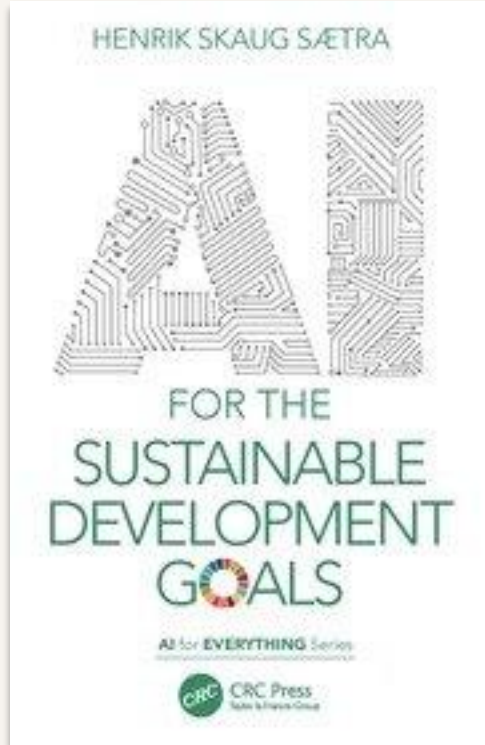
- information and knowledge
- efficiency and optimization
- technological innovation
- commodification

It manifests the status quo and prevents a
fundamental transformation in alignment with the SDGs.

Risks of Big Tech corrupting Green AI

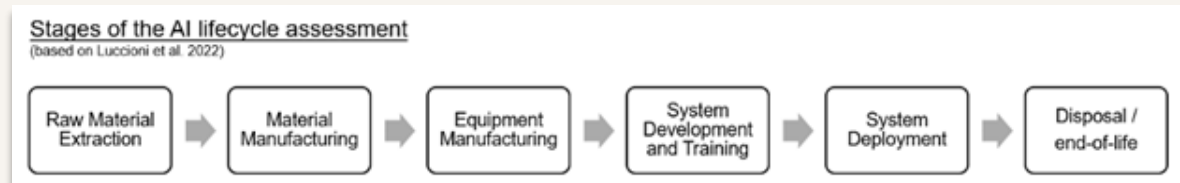
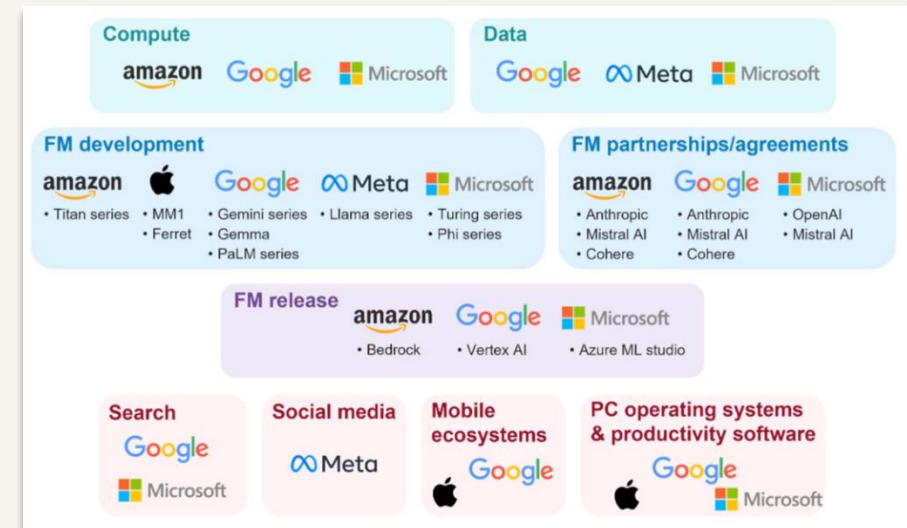
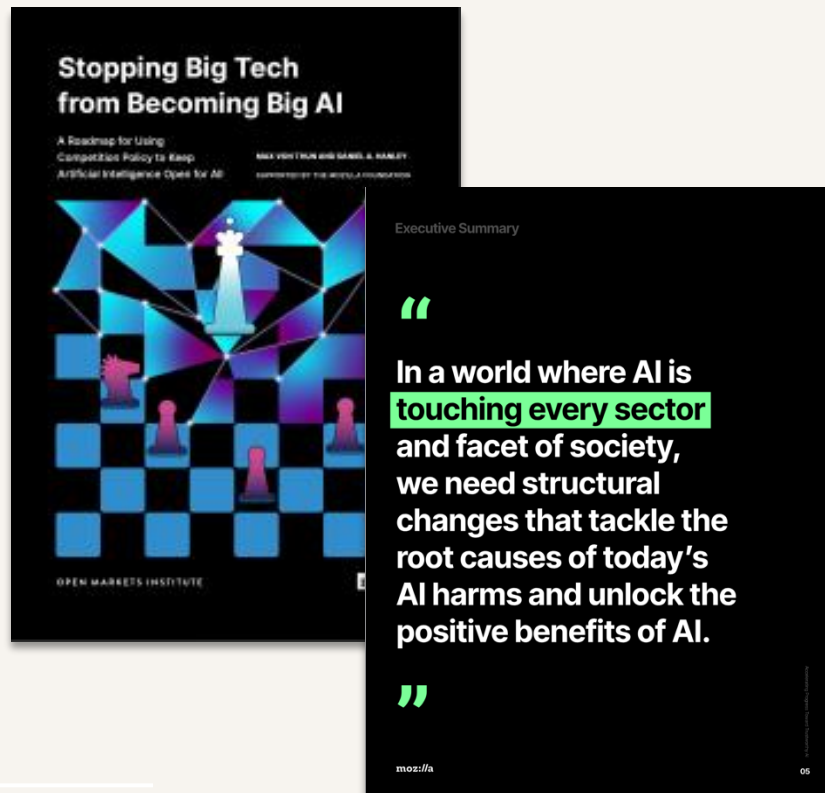
- Emission or resource fetishism
- Impossibility of global net calculations of AI impacts
- Inadequacy of Risk-Benefit-Dichotomies
- Commodification of sustainability crisis
- Manifesting of structural injustices

Global Distributional Justice



„The SDGs allow us to consider the impact of AI on our lives and environments, this requires us to understand the context of AI – the infrastructure it is built on, who develops it, who owns it, who has access to it, who uses it, and what it is used for – rather than relying on an isolationist theory of technology.“

„Today’s AI ecosystem is structurally flawed in ways that prevent us from realizing the full potential of AI, while also allowing AI harms to go unchecked.“



FOR ALGORITHMS TO WORK,

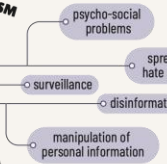
all of us, technology consumers worldwide, are doing invisible labour for these companies through...



Hate speech and disinformation boost engagement

SURVEILLANCE CAPITALISM

DIGITAL COLONIALISM



TECH CARTOGRAPHIES

YOUR CLOUD IS IN TERRITORIES

The Internet is nothing like a cloud. It is a physical structure, geolocated and crossed by power relations. Who holds the power in this structure? Who has access

to this technology? Who profits, who loses, who consumes, who regulates? The Internet is also a territory in dispute, a clash that affects our offline struggles.

CODING RIGHTS

MORE THAN HALF OF THE WORLD'S ELECTRONICS MANUFACTURING IS IN CHINA. Virtually all circuit boards are printed there. Even the United States is dependent on the production of basic components in China.

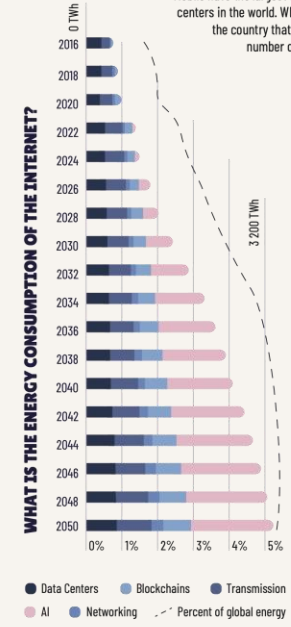
One of the largest Google data centers in the world is located in The Dalles, Oregon, USA. Its water consumption has nearly tripled in the past 5 years, using over 25% of the water supplied to the city. The consumption is expected to increase as there are plans for two more data centers in the coming years.

None of the CEOs of the big tech companies is a woman and, with rare exceptions, they are all male, white, cisgender, heterosexual, capitalist and capitalist. These are the worldviews transposed to software and algorithms, which are something like the soul of the electronic devices we use. These technologies operate on the logics of data extraction from bodies and territories and violently erase diversities.

There are over 420 submarine cables deployed around the globe. Their distribution follows the routes of telegraphs and colonial navigations. The largest cable is owned by the American company AT&T, followed by China Telecom. However, in recent years, 80% of the investment in new cables comes from Facebook and Google.

DATA CENTERS ACCOUNT FOR ABOUT 4% OF GLOBAL ENERGY CONSUMPTION AND 1% OF GLOBAL GREENHOUSE GAS EMISSIONS.

China Telecom and China Mobile have the largest data centers in the world. While the USA is the country that has the highest number of data centers.



MEXICO, CUBA, PANAMA, COLOMBIA, VENEZUELA, ECUADOR, PERU, CHILE, ARGENTINA, URUGUAY, BOLIVIA, PARAGUAY.

Gold is illegally extracted on Kayapó, Mundurucu and Yanomami indigenous lands, now traded by refiners supplying Apple, Microsoft, Google and Amazon.

BRAZIL

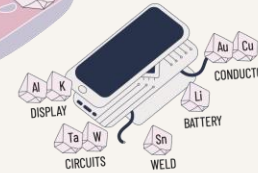
Some 58% of the world's lithium reserves are in Latin America, mainly between Chile, Argentina and Bolivia.

HOUSEHOLDS WITH INTERNET ACCESS IN BRAZIL (2022)
Southeast 82%
Northeast 78% (*18% via 3G/4G)
South 81%
North 76% (*33% via 3G/4G)
Central-West 83%

62% of the Brazilian population has access only through mobile phones (2022)

43% of the population in favelas have precarious access to the network (2021)

32% of rural households lack access to the network. Many are in indigenous and quilombola territories, primarily in the North and Northeast.



China, major electronics manufacturer for the world, is the largest producer of e-waste. But unlike China, second place comes the USA. But unlike China, which is also the largest importer of such waste, the US exports its toxic waste to India, China, and several countries in Africa.

Many content moderation operations are outsourced to countries such as India, Kenya, the Philippines, and other Southeast Asian nations, where there is a large pool of English-speaking workers. The work conditions of these "cleaners" are abusive, marked by low pay, secrecy, and mental health consequences. But despite NDAs and alleged union-busting attempts, workers are unionizing and taking Big Tech to court.

HAVE YOU HEARD OF ASTRONOMICAL POLLUTION?

In less than a decade, 1 in every 15 points of light in the night sky will be a moving satellite, causing significant changes for those who observe the sky. The most visible satellites are the ones in low orbit, like those from Starlink. Worse yet, the company plans to launch another 42,000 satellites by mid-2027.

Tech Cartographies is a project developed by Coding Rights, in collaboration with the Rede Transfeminista de Cuidados Digitais and with the support of Heinrich-Böll Foundation Brazil and Ford Foundation.

Concept: Joana Varon and Clarote Researchers: Joana Varon, Bruna Zanelli and Mari Tamari Design: Clarote Interactivity: Diana Cury

License: CC BY NC ND

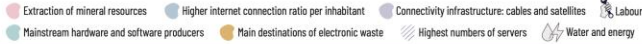
Realization: CODING RIGHTS

Support: HEINRICH BÖLL STIFTUNG BRÜSEL, JARICHO

<https://www.cartografiasdaineternet.org/en>

By Joana Varon

GEOPOLITICAL DIMENSIONS OF THE INTERNET



All references and sources of data presented on the map are available on the project's platform and can be accessed under cartografiasdaineternet.org on your browser or via this QR code.

CREDITS

Tech Cartographies is a project developed by Coding Rights, with collaboration from the Transfeminist Network for Digital Care and support from the Heinrich Böll Foundation Brazil and the Ford Foundation.

Concept: Joana Varon, Clarote Research: Joana Varon, Bruna Zanelli, Mari Tamari Design: Clarote

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Works like magic....

„ (...) a defining feature of magic (...) is that it is ‘**costless**’ in terms of the kind of **drudgery, hazards, and investments** that actual technical activity inevitably requires. Production ‘by magic’ is production minus the disadvantageous side-effects, such as **struggle, effort, etc.**” (Gell, 1988, p. 9). To evoke magic is not only to provide an alternative regime of causal relations, but also to **minimize the attention to the methods and resources required** to carry out a particular effect.“

Elish & boyd 2017

What to do about it

- Be aware of what cannot be addressed on the (technical) system level
- Re-claim Green AI discourses
- Push for policies (individual, organizational and more broadly) to address distributional injustices of digital infrastructures
- De-mystify Big Tech narratives and lobbying on AI and sustainability

Thank you!